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NOTES FOR A HISTORY OF STEAM NAVIGATION.

I.

1543—1793.

1543.—June 17, Blasco de Garray, a native of Biscay, is asserted to have tried a steamboat of two hundred and nine tons, called the "Trinity," with tolerable success, at Barcelona, in Spain. The power consisted in a caldron of boiling water, and a movable wheel on each side of the ship.

The following is the story of De Garray in full:

In 1543 a mechanic of Marina, named Blasco de Garray, offered to exhibit in the presence of the Emperor Charles V. a machine by means of which a vessel might be impelled without the assistance of sails or oars. The proposition in the first place appeared ridiculous, but the engineer remained so convinced that the power of the machine would be adequate to the production of the effect announced, that he commenced anew his representations to the government, supplicating his majesty to command the execution of the project. The emperor, in consequence, appointed a commission to proceed to Barcelona to witness the experiment and to report upon the result. The engineer, Garray, secure now of making a proof of his invention, prepared a merchant ship called "La Trinidad," of two hundred tons burthen (thus states the record), and, the commissioners having arrived, the experiment was made on the 17th of June, 1543. Immediately upon a given signal, the vessel was put in motion; proceeding forward, it turned from one side to the other, according to the will of the steersman, and finally

returned to the place whence it started without the assistance of sails, oars, or any visible machinery, except an immense caldron of boiling water, a complicated number of wheels within, and paddles gyrating without. The multitude assembled on the seashore remained filled with admiration at the sight of this prodigy, the port of Barcelona resounded with applause, and the commissioners, who witnessed the performance with the greatest enthusiasm, related to the emperor that Garray had accomplished with his machine as much as he had undertaken to do. But the head of the commission, Ravago, who was then chief treasurer of the kingdom, either through ignorance or some other of those unseen causes which influence the conduct of statesmen, showed himself but little favorable either to the inventor or the machine. After confessing the success of the experiment, and expressing his approbation of the ingenuity of Garray, he endeavored to persuade the emperor that the invention would be of little or no utility; that its complicated construction would require constant repairs, attended with immense expense; that the vessel would not proceed at the rate of much more than a league an hour, and much more slowly when freighted; and, finally, that the boiler, unable to resist the force of the steam for any extended period, would frequently burst and become productive of the most dreadful accidents. Such was the substance of the opinion given by this covetous or invidious minister. Though Charles V. remained persuaded by the representations of his treasurer, he was not insensible to the merits of the inventor, whom he promoted to the rank of an officer, and in addition to the expenses of the experiment, presented him with a reward of two hundred thousand *maravedis* from the royal treasury, equivalent to sixty-six thousand *reales de vellon*, a very considerable sum at that period, and the munificence of which proves that the invention of Garray equaled, if it did not surpass, the most extraordinary productions of that era.

This statement was first published in 1826, by Thomas Gonzales, on the authority of documents said by him to have been discovered among the state papers at Simancas. Recent researches among those papers have failed to discover the documents in question, and the whole story is by universal consent considered a fable.

1630.—In Sanderson's edition of Rymer's "Fœdera," vol. xix., there is a copy of a patent granted by Charles I. to David Ramseye, a groom of the privy chamber, dated January 21, 1630. Among its specifications is one "To raise water from low pits by fire," and another, "to make boats, shippes, and barges to go against strong wind and tide."

1641.—A letter written by Marion Delorme, dated at Paris, February, 1641, suggested to Dumas one of the best scenes in one of his wonderful romances.

"PARIS, February, 1641.

"MY DEAR EFFIAT,—While you were forgetting me at Narbonne, and giving yourself up to the pleasures of the court and the delight of thwarting M. le Cardinal de Richelieu, I, according to your express desire, am doing the honors of Paris to your English lord, the Marquis of Worcester; and I carry him about, or rather, he carries me, from curiosity to curiosity, choosing always the most grave and serious, speaking very little, listening with great attention, and fixing on those whom he interrogates two large blue eyes, which seem to pierce to the very centre of their thoughts. He is remarkable for never being satisfied with any explanations which are given him; and never sees things in the light in which they are shown to him. You may judge of this by a visit we made together to Bicêtre, where he *imagined he had discovered a genius in a madman.*

"If this madman had not been actually raving, I verily believe your marquis would actually have entreated his liberty, and have carried him off to London, in order to hear his extravagancies from morning to night at his ease.

"We were crossing the court of the mad-house, and I, more dead than alive with fright, kept close to my companion's side, when a frightful face appeared behind some immense bars, and a hoarse voice exclaimed, '*I am not mad! I am not mad! I have made a discovery which would enrich the country that adopted it!*' 'What has he discovered?' I asked the guide. 'Oh,' he answered, shrugging his shoulders, 'something trifling enough,—you would never guess it: IT IS THE USE OF THE STEAM OF BOILING WATER.' I began to laugh. 'This man,' continued the speaker, 'is named SALOMON DE CAUS; he came from Normandy four years ago, to present to the king a statement of the wonderful effects that might be produced from this invention. To listen to him you would imagine that with steam you COULD NAVIGATE SHIPS, move carriages,—in fact, there is no end to the miracles which, he insists upon it, could be performed. *The cardinal sent the madman away without listening to him.* SALOMON DE CAUS, far from being discouraged, followed the cardinal, wherever he went, with the most determined perseverance, who, tired of finding him forever in his path, and annoyed to death with his folly, ordered him to be shut up in the Bicêtre, where he has now been for three years and a half, and where, as you hear, he calls out to every visitor that *he is not mad, but that he has made a valuable discovery.* He has even written a book upon the subject, which I have here.'

"Lord Worcester, who had listened to this account with much interest, after reflecting a time, asked for the book, of which, after reading several pages, he said, 'This man is not mad. In my country, *instead of shutting him up,* he would have been rewarded. Take me to him, for I should like to ask him some questions.'

"He was, accordingly, conducted to his cell, but, after a time, he came back sad and thoughtful. 'He is indeed mad now,' said he; 'misfortune and captivity have alienated his reason, but it is you who have to answer for his madness. When you cast him in that cell you confined THE GREATEST GENIUS OF THE AGE!' After this we went away, and since that time he has done nothing but talk of SALOMON DE CAUS. Adieu! my dear and faithful Henry. Make haste and come back, and pray do not be so happy where you are as not to keep a little love for me.

"MARION DELORME."

1651.—An anonymous pamphlet was published in London, entitled "Inventions of Engines of Motion lately brought to Perfection," etc. The author claims "to have erected one little engine or great model at Lambeth," which among its capabilities was intended "*to draw or haul ships, boates, etc.*, up river against the stream." Steam is not indicated in the pamphlet, but it is difficult to conceive any other agent, unless some explosive compound by which the pressure of the atmosphere was exerted.

1663.—The Marquis of Worcester published a little book which he called "A Century of the Names and Scantlings of Inventions," in which he evidently describes an engine capable of raising water by the repellant power of steam. In this book one hundred inventions are enumerated, but the account of each is so short as often to be very obscure. Among his other boasts he says, "I can make a vessel, of as great a burthen as the river can bear, to go against the stream, which the more rapid it is the faster it shall advance, and the movable part that works it may be by one man still guided to take advantage of the stream, and yet steer the boat to any point; and this engine is applicable to any vessel or boat whatsoever, without, therefore, being made on purpose; and it worketh these effects,—it moveth, it draweth, it driveth (if need be) to pass London Bridge against the stream at low water; and a boat laying at anchor, the engine may be used for loading and unloading." A recent investigation of his patent shows, as it is expressly so stated, that he had no idea of using steam, but "the force of the wind or stream caused its motion."

1690.—Denis Papin, a French engineer, who was forced, after the revocation of the Edict of Nantes, to quit his country, took refuge at the court of the landgrave of Hesse, and was a professor of mathematics at the University of Marburg during several years. In 1690 he published a methodical and clear description of the fire-engine, now known as the atmospherical engine, and suggested the practicability of applying the power of steam to the navigation of rivers.

1695.—Papin, in another work dated 1695, says, "It would be too long to describe here in what manner this invention (the atmo-

spherical engine) could be applied to drain rivers, throw bombs, and *row against wind.* I cannot abstain from remarking how much this power would be preferable to that of galley-slaves to navigate with rapidity to sea." Papin next criticises the use of men as agents, who, he says, occupy a larger space, and consume a great deal, even when they do no work, and observes that his tubes or pumps would be less cumbersome; "but," he adds, "as they cannot be conveniently adapted to ply common oars, it would be necessary to apply to them rotatory oars." He mentions having seen oars of that description fixed to an axle-tree in a boat belonging to Prince Robert of Hesse, which were turned by horses. He thought, however, that they might be put in motion by the *aid of a steam-engine.* To D. Papin is attributed the invention of the safety-valve.[1]

1698.—July 25, 1698, Captain Thomas Savary, an Englishman, took out a patent for raising water by the impellant force of fire. The same year he recommended the use of paddle-wheels similar to those now employed on steam-vessels, though without in the remotest degree alluding to his engine as a prime mover. It is probable he intended to employ the force of men or animals working a winch. In 1696 he obtained a patent for rowing ships with greater ease and expedition than had hitherto been done by any other. In 1698, "*He believed steam might be made useful to ships,*" but not daring to meddle with the matter, left it to the judgment of those who were better judges of maritime affairs.

1699.—M. Duguet appears to have tried revolving oars; and experiments were made with them on a large scale, both at Havre and Marseilles. This mode was soon given up as impracticable.

1736.—In the autobiography of the late John Barrow, undersecretary of the Admiralty, the following assertion occurs: "That neither Lord Stanhope, nor Fulton, nor the American Livingstone, nor Patrick Miller, nor his assistant, Symington, have the least claims of priority to the application of steam and wheels for propelling vessels.

[1] The "Encyclopædia Britannica" appears to think that Papin's suggestions for the application of steam to navigation must be considered as theory alone, never carried out. But his correspondence with Leibnitz, which has recently been brought to light, fully proves *that he actually constructed a steamboat which he navigated upon the river Fulda;* which boat may serve as a warning to men not to be too clever for their age. M. Fournier relates that Papin labored at his construction for some years at Hanau, and that at Cassel, in presence of the landgrave, the boat was launched. The experiment succeeded, but he derived from it nothing but scorn, ridicule, or abuse. He was treated as a charlatan and a fool. Disgusted with the conduct of the Hessians, Papin attempted to go to London in his own vessel. He descended the Fulda as far as Münden, and was entering the Weser, formed by the union of the Fulda and Werra, when the boatmen of Münden, envious or suspicious of what might arise from the invention, laid violent hands upon him and his boat,—he escaped with difficulty, but his boat was destroyed. He tried in vain to obtain redress; and then came to reside in London, where he died three years afterwards, without having built a new boat.

There can be no doubt that Jonathan Hulls was the real inventor of the steamboat."

According to the tradition current in the neighborhood in which he was born, Hulls was the son of a village mechanic at Hanging-Aston, near Campden, Gloucestershire; the name of the child being entered in a baptismal register December 17, 1699. Thomas Hull, or Hulls, the father, having removed from Aston to Campden, the boy was educated at the ancient grammar school there. With a natural turn for mechanics, Jonathan Hulls was brought up as a clock-maker, or rather clock-mender, —one of a humble class of artisans whose business it is to make a circuit through a certain district, cleaning and repairing cottage and farm-house clocks, as well as the clocks of churches. He married early, and settled in the hamlet of Broad Campden about 1729.

During the earlier years of manhood Hulls bore the reputation of being a thoughtful and studious man, and his neighbors regarded his superior mental powers with no small degree of respect. It is asserted that the idea which has given him some claim to posthumous honor occurred to him while he was yet young, and was matured in his own mind long before any channel was opened through which he could hope to make it known to the world; for Hulls had a family to support, and no means beyond a poor and precarious handicraft. A patron at last appeared in a Mr. Freeman of Batsford Park, whose seat (now that of Lord Redesdale) is situated about a mile from Aston, the native place of the inventor. By means of funds provided by this gentleman Hulls was enabled to go to London to procure a patent, and to publish a pamphlet in which his invention is described.

His patent is dated December 21, 1736, when Hulls was thirty-seven years old, and bears the sign-manual of Queen Caroline as a witness. In this instrument the invention is described as a "machine for carrying ships and vessels out of or into any harbour or river against wind and tide;" and it further sets forth that as the inventor could not at that time "safely discover the nature of his invention," he was afterwards to enroll a description of the same in the High Court of Chancery.

The little publication in which Hulls attempted to make his scheme known to the world was printed in London in 1737. It is entitled "A Description and Draught of a new-invented Machine for carrying Vessels or Ships out of or into any Harbour, Port, or River against Wind and Tide or in a Calm." In his preface he says, "There is one great hardship lies too commonly upon those who propose to advance some new though useful scheme for the public benefit. The world abounding more in rash censure than in a candid and unprejudiced estimation of things, if a person does not answer their expectations in every point, instead of friendly treatment for his good intentions, he too often meets with ridicule and contempt. But I hope this will not be my case, but that

they will form a judgment of my present undertaking only from trial. If it should be said that I have filled this tract with things that are foreign to the matter proposed, I answer: There is nothing in it but what is necessary to be understood by those who desire to know the nature of that *machine* which I now offer to the world, and I hope that, through the blessing of God, it may prove serviceable to my country."

This pamphlet appears to have attracted no attention, and Freeman, unwilling to risk further outlay, abandoned Hulls and his project. It is therefore evident that the invention did not receive a practical trial, and whatever hopes the projector might have based upon its success were disappointed.

Commercially, like all the other ventures of Jonathan Hulls, it proved to be a complete failure. Incurring some derision from his want of success, he quitted the place where he was best known and hid himself among the crowds of London, and, with what might be called a broken heart, died in extreme poverty, the date of his decease being unknown.

Jonathan Hulls was a man of no ordinary capacity, but we cannot concede that he "was the inventor of the steamboat." He, undoubtedly, in a rough way, was the first to point out how steam might be employed in the propulsion of vessels. His scheme was clever, but purely speculative. It did not receive any practical trial, and, like many other efforts of genius, came to nothing. John Scott Russell, however, in the "Encyclopædia Britannica," asserts that Hulls not only made a model of his invention, but that a boat was actually constructed and usefully employed.

1752.—Gautoir, a regular canon, and professor of mathematics, presented to the Royal Society of Nancy a memoir, in which, after having shown the inconveniences of navigation by means of sails, he employed a fire-engine (*machine feu*) of his own invention for navigating purposes.

1753.—Daniel Bournoulli wrote a memoir mathematically proving that a steam-engine might be used to advantage in vessels, which gained him a prize offered by the French Academy of Sciences.

His proposition was to propel vessels by wheels, with vanes set at "an angle of sixty degrees both with the arbor and keel of the vessel, to which the arbor is placed parallel. To sustain this arbor and the wheels two strong bars of iron, of between two and three inches thick, proceed from the sides of the vessel, at right angles to it, about two feet and a half below the surface of the water." The propellers for the stern he describes to be of similar construction, but shorter, and for driving them he says they "can be moved by men aboard the vessels, *or by steam engines*, or on rivers by horses placed in the barges."

Bournoville's plan is described, and several modifications proposed,

in "Annales des Arts et Manufactures," tome 20, p. 329 (A.D. 1803). These represent, by drawings, shafts annexed at the sides, bow, and stern of the vessel. Each shaft carries eight wheels, each wheel having eight spokes with inclined, broad vanes at the ends. It is suggested that a shaft might go out at the stern, under water, through a stuffing-box, and means are described for raising the shaft which is under water. The steam-engine is proposed to be used to turn the shaft by having a T cross-head on the piston-rod, working vertically, with a crank or connecting-rod at each end, turning wheels, one of which works the shaft.

In 1753 Euler proposed to use a shaft with four floats at right angles. This was worked by a vertical shaft with a toothed wheel and pinion. Fincham's "History of Naval Architecture" has a drawing of this device.[2]

In the same year "Mathon de la Cour proposed floats on each axle, and the intervention of an endless cord passing over a drum at the end of the axle, which was fastened to the side of the ship, and over a corresponding drum annexed to the frame."[3]

1756.—There was discovered in 1851, in the archives of Venice, a treatise on "Navigation by Fire," by M. Gautier, member of the Royal Society of Paris, which shows that the professor's plans for steam navigation were exhibited by him to the Venetian republic in 1756.

1759.—M. Genevois, a Swiss clergyman of the canton of Berne, published a book at Geneva containing what he called the discovery of the "*Great Principle.*" This was to concentrate power by whatever means obtained into a series of springs, which might be applied to a variety of purposes, among which he suggested the application of the "Great Principle" to propel a vessel by oars, and also proposed the application of an atmospheric steam-engine to bend or empower the springs by which the oars were to be worked; but his favorite project appears to have been to accomplish that object by the expansive force of gunpowder. M. Genevois visited England in 1760, and submitted his plan to the Board of Admiralty, but without receiving any encouragement. His apparatus resembled in principle the feet of aquatic birds, opening when moving through the water in one direction, and closing on its return.

1774.—The Comte de Auxiron made an experiment, but his boat moved so slowly and irregularly that those who had been at the expense of the trial at once abandoned all hopes of success.

1775.—The elder Perrier, for whom M. Arago claimed the honor of having constructed the first steamboat, and who was afterwards celebrated as the introducer of the manufacture of steam-engines into

[2] Page 280. London ed. 1851.

[3] Fincham's History of Naval Architecture. London, 1851, p. 280, for drawing.

France, in 1775, constructed a vessel impelled by a steam-engine; but the power of the engine was so small—being scarcely that of one horse—that it could not impart sufficient velocity to the vessel to ascend the river Seine to any advantage. Not discouraged, and ascribing his failure to the use of paddle-wheels, he applied himself for some years to the search for other substitutes for oars. It does not appear, however, that he made any valuable discovery.

M. Ducrest published a work in 1777, which contains an account of various experiments made by Perrier in his presence.

In 1776 Guyon de la Plombiere suggested the use of the steam-engine for propelling a vessel.[4]

Mr. Andrew Ellicott, an American, in 1775, states that he had a conversation on the subject of steam with Mr. William Henry, of Lancaster, who suggested the possibility of applying steam to vessels, as did also Mr. Thomas Paine, the author of "Common Sense," in 1778.

1778.—The Marquis de Jouffroy made his first experiments, in 1778, at Baumes les Dames, and in 1781 he built upon the Saône a steam-vessel one hundred and forty feet long by twenty feet wide. In 1783, his experiments became the subject of a favorable report made to the French Academy of Sciences by Borda and Perrier. M. de Jouffroy demanded a patent, but before it was granted the Revolution compelled him to emigrate. On his return to France, in 1796, he learned that M. de Blanc, an artist of Trévoux, had obtained a patent for the construction of a steamboat.

March 10, 1779, Matthew Washbrough took out a patent for machinery to be attached to a steam engine, one use of which he mentions as follows: "Lastly, I intend to apply my engine, as described above, for the purpose of moving ships, boats, and lighters, or any vessel in water."

1782.—The Abbé Darical proposed several plans, which were in no way superior to Perrier's, and were speedily laid aside. In 1782, Desblancs sent a model to the Conservatoire des Arts et Métiers of a steamboat moved by a chain of floats carried by wheels at its side turned by a horizontal cylinder.

1783.—In the Great Patent Office Library, England, there is a copy of a French print by Jamont, dated A.D. 1816, entitled "Plan et profil du Bateau à Vapeur exécuté par M. L. Marquis de Jouffroy à Lyon, en 1783." It represents a steamboat one hundred and forty feet long, with paddle-wheels on a shaft turned by a single horizontal steam cylinder and a piston, with double rack work and pauls on the piston-rod.

1784.—Moses Hunter, under date May 19, 1788, certifies that in November, 1784, being at Richmond, Virginia, attending the Assem-

[4] Encyclopédie Moderne. Paris, 1855. Article "Vapeur," 171.

bly as a representative from the county of Berkeley, Mr. James Rumsey informed him in confidence that "he intended to construct a boat which was to be wrought altogether by steam; that he had tried the principles, some of which he mentioned." From the whole tenor of the conversation, he understood Rumsey that his principal dependence for the operation of his boat was upon steam. A rude model seems to have been first exhibited to a select company of visitors to Berkeley Springs in the year 1784. No less a person than George Washington was of the favored few who witnessed the successful launch of the little boat, and testified to the value of the discovery. Fearful of his invention being stolen, Rumsey appears to have sworn all who witnessed the experiment to secrecy, for the certificate given him by General Washington, and meant for publication, is so carefully worded as to avoid using the word steam. It reads:

"I have seen the model of Mr. Rumsey's boat, constructed to work against the stream; examined the powers upon which it acts; been eye-witness to an actual experiment in running waters of some rapidity; and give it as my opinion (although I had little faith before) that he has discovered the art of working boats by mechanism and small manual assistance against rapid currents; that the discovery is of vast importance, may be of the greatest usefulness, in our inland navigation; and if it succeeds, of which I have no doubt, the value of it is greatly enhanced by the simplicity of the work, which, when explained, may be executed by the most common mechanic.

"Given under my hand and seal, in the town of Bath, county of Berkeley, in the State of Virginia, this 7th of September, 1784.

"GEORGE WASHINGTON."

Later, Rumsey gave a public exhibition on the river, at Shepherdstown, Virginia, and afterwards, encouraged by his success, sailed for England, but thought it necessary first to destroy his precious model. He hoped in that older and richer country to perfect his work and realize fame and fortune. He was doomed to disappointment, and, after a long and harassing struggle, died before completing and satisfactorily demonstrating the principles of a new model.

A gentleman had, not many years ago, in his possession letters written by Rumsey in London, which mentioned receiving frequent visits there from a young American studying engineering, who showed a sympathetic and intelligent interest in Rumsey's labors. This was no other than Robert Fulton, who, nineteen years after Rumsey's death, gave the world a successful steamboat.

1785.—Thomas Jefferson, writing from Paris in 1785, describes a vessel then recently invented, which he examined while in operation. He says the inventor did not himself know the principle of his own invention. "It is a screw with a very broad or thin worm, or rather it is a thin plate, with its edge applied spirally round an axis. This being turned operates on the *air* as a screw does, and may be literally said to screw the vessel along. . . . The screw, I think, would be

more effectual if placed below the surface of the water." Mr. Jefferson adds to his notes on this invention that he thinks Mr. Bushnell, of Connecticut, has a prior claim to the invention of the screw as a motive-power for vessels. During the Revolutionary war, he invented a submarine torpedo-vessel, to be driven by screws. This torpedo was the original of Fulton's, and may have been the first instrument of its kind; but the screw had been suggested as a motive-power for vessels long before the time of Bushnell. Brande's Dictionary says that "The screw-propeller is probably as old as the windmill, and a windmill of the construction now usually employed is represented in the seventy-seventh proposition of Hero's 'Spiritalia,' a work written one hundred and thirty years before the Christian era." For a century and a half efforts were made to introduce the screw as a propeller of vessels before Ericsson and Smith successfully demonstrated the utility of the screw, and its advantages over paddle-wheels.

The first attempt to connect a steam-engine with a screw-propeller was made by Joseph Bramah, of Piccadilly, engine-maker, who, on the 9th of May, 1785, took out a patent for improvements in machinery, among which are described two new methods of propelling vessels through the water. The first of these contrivances was the application of a paddle-wheel to the stern of the vessel, which wheel was driven by a steam-engine, the rudder being placed in the *bow*, instead of the stern, in order to facilitate this contrivance.

His other invention was the application to the stern of the vessel of "a wheel with inclined fans or wings, similar to the fly of the smoke-jack or the vertical sails of a windmill." This wheel was to be fixed on the spindle of the rotatory engine without intermediate gearing, and wholly under water, where, by being turned either way, it would force the ship backward or forward, as the inclination of the fans or wings would act as oars with equal force both ways, and their power be in proportion to the size and velocity of the wheel, allowing the fans to have a proper inclination. Where the engine-shaft passed through the vessel it was to be made tight with a *stuffing-box*.

This is considered to be the *first* attempt at coupling together a submerged screw-propeller and the steam-engine for the propulsion of vessels, but there is no evidence that Bramah ever made or tried a propeller of the kind, and his rotary engine by which it was to be driven turned out a failure.

At a special meeting of the American Philosophical Society of Philadelphia, held on the 27th of September, 1785, John Fitch laid before it a drawing and description of a machine for working a boat against a stream by means of a steam-engine, and on the 2d of December following presented a copy of the model and drawing to the society, as appears by the minutes of Samuel Magan, one of the secretaries.

In the latter part of the year Fitch set out from Philadelphia with a view of visiting Kentucky, but turned aside from his purpose at Richmond, and petitioned the Legislature of Virginia for assistance for his steamboat. No formal report was made, but believing that the experiment would not be costly, he executed a bond to Patrick Henry, governor of Virginia, conditioned that if he should sell one thousand copies of his map of the Western country in that State at 6*s.* 8*d.* each, he would, in nine months thereafter, exhibit a steamboat in the waters of Virginia or forfeit the penalty of three hundred and fifty pounds.

In November of the same year he received from Patrick Henry, the governor of Virginia, the following certificate:[5]

"I certify that John Fitch has left in my hands a bond, payable to the governor for the time being, for £350, conditioned for exhibiting his *steamboat* when he receives subscriptions for one thousand of his maps, 6*s.* 8*d.* each.

(Signed) P. HENRY.

"November 16, 1785."

This provision was never put in operation, because the sales of the maps were very small. On his way back to Pennsylvania to print the maps, he stopped at Philadelphia, and presented a petition for assistance to the Legislature of Pennsylvania, and went immediately afterwards to Annapolis and made a similar application to the Legislature of Maryland. These attempts were not successful, and an effort to induce the State of New Jersey to appropriate one thousand pounds of loan certificates for the purpose of building a steamboat also failed. Shortly afterwards the Legislature of the latter State passed a law giving to John Fitch the exclusive right for fourteen years of making and using all and every species of boats or water-crafts which might be urged or propelled by the force of fire or steam in the waters of the State. He then returned to Philadelphia, and succeeded in forming a company. The stock was divided into forty shares. The original subscribers were Samuel Vaughn, Richard Wells, Benjamin W. Morris, John Morris, Joseph Budd, John and Chamless Hart, Thomas Say, Magnus Miller, Gideon Hill Wells, Thomas Palmer, Thomas Hutchins, Richard Wells, Jr., John Strother, Israel Israel, William Reubel, and Edward Brooks, Jr., each of whom had one share; Richard Stockton, of Princeton, three shares; Benjamin Say, two shares. Stacy Potts, of Trenton, was an early member of the company, but soon withdrew from it. In the beginning it was agreed that Fitch should have twenty shares for his interest and services in the experiment. The first difficulty of the company was about the making of a steam-engine. The assistance of Henry Voight, an ingenious clock- and watch-maker of Philadelphia, whom

[5] U. S. Patent Reports, 1849–50.

Fitch looked upon as a practical man of sound sense and experience, was obtained, and shares were gradually made over for his services, until in 1787 he held five.

The subscribers generally paid in twenty dollars each on their shares, and with this small sum the experiments were commenced. A model steam-engine, with a cylinder of one inch diameter, was made, but, although it worked, it was too small to demonstrate anything. A new model, with a three-inch cylinder, was then made and applied to a small skiff. With this machinery trials were made on the Delaware, about the 20th of July, 1786, with "a screw of paddles," a screw-propeller, the endless chain, and the side wheels, without much success. The next night, while in bed, Fitch thought of a plan of rowing the boat by oars or paddles on the sides, to be moved by cranks worked by machinery. He immediately rose and drew a plan, and the next morning showed it to Voight, who approved of it with some modifications. This was afterwards tried on the skiff with the steam-engine, and the first boat successfully propelled by steam in America was moved in the Delaware on the *27th of July*, 1786, with flattering promises of the future usefulness of the invention.

The members of the company were so much pleased with its success that they determined to build a steamboat for practical use, as a passage and freight boat. But the original subscriptions were now exhausted, and the share-holders were tardy in the payment of new installments. Fitch induced a committee of the Assembly of Pennsylvania to report, in September, in favor of loaning him one hundred and fifty pounds; but the House rejected the report by a vote of twenty-eight yeas to thirty-two nays. Application was made to General Mifflin without success. Matters then languished for a while, during which a law was passed by the State of Delaware securing Fitch's right to the invention. A new deed was signed by the share-holders in February, 1787, and fresh advances were made. The engine was to be of twelve-inch cylinder, and the boat twelve feet beam and forty-five feet long. The engine was finished in May, 1787, but "the wooden caps" to the cylinder admitted air, and the piston was leaky. The works were all taken out to the foundation and set up again, when the condensation was found to be imperfect. New condensers and other machinery were made, and the boat moved at times as fast as three or four miles an hour. But something was continually going wrong. The work was very imperfect, the details of such machinery being unknown in America, and the workmen common blacksmiths. By entreaty the company was induced to persevere. On the 22d of August, 1787, this boat was propelled on the Delaware in the presence of nearly all the members of the convention to frame the Federal Constitution; but the rate of progress was too slow to satisfy the projector. Nevertheless, certificates of the perfect success of this attempt were given by Governor Randolph, of Virginia,

Dr. Johnson of the same State, David Rittenhouse, the astronomer, Andrew Ellicott, professor in the Episcopal Academy, and Dr. John Ewing, of the University.

The following description of Fitch's steamboat was communicated to the *Columbian Magazine* by the inventor:

"PHILADELPHIA, December 8, 1786.

"TO THE EDITOR OF THE COLUMBIAN MAGAZINE.

"SIR,—The reason of my so long deferring to give you a description of the steamboat has been in some measure owing to the complication of the works, and an apprehension that a number of drafts would be necessary in order to show the powers of the machine as clearly as you would wish. But as I have not been able to hand you herewith such drafts, I can only give you the general principles. It is in several parts similar to the late improved steam-engines in Europe, though there are some alterations. Our cylinder is to be horizontal, and the steam to work with equal force at each end. The mode by which we obtain what I take the liberty of terming a vacuum is, we believe, entirely new, as is also the method of letting the water into it, and throwing it off against the atmosphere without any friction. It is expected that the engine, which is a twelve-inch cylinder, will move with a clear force of eleven or twelve hundred weight after the frictions are deducted; this force is to act against a wheel of eighteen inches diameter. The piston is to move about three feet, and each vibration of the piston gives the axis about forty evolutions. Each evolution of the axis moves twelve oars or paddles, five and a half feet, which work perpendicularly, and are represented by the stroke of the paddle of a canoe. As six of the paddles are raised from the water six more are entered, and the two sets of paddles make their strokes about eleven feet in each evolution. The cranks of the axis act upon the paddles about one-third of their length from the lever end, on which part of the oar the whole force of the axis is applied. Our engine is placed in the boat about one-third from the stern, and both the action and reaction turn the wheel the same way.

"With the most perfect respect, sir, I beg leave to subscribe myself,

"Your very humble servant,

"JOHN FITCH."

1787.—Mr. Patrick Millar published in English and French an account of his naval experiments, illustrated with plates, copies of which were presented to every sovereign in Europe, to the American States, and to the Royal Societies in London and Edinburgh. In this work, speaking of the use of wheels as the moving power of vessels, he says, "I have reason to believe *that the power of the steam-engine may be applied to work the wheels so as to give them a quicker motion*, and con-

sequently to increase that of the ship. In the course of the summer I intend to make the experiment," etc.

The same year Millar took out a patent for propelling boats by means of paddle-wheels turned by men. His vessel had a double deck, was sixty feet long, and had two wheels turned by two men each.

During the summer Mr. James Taylor proposed to Millar the application of a steam-engine to the wheels of his boat in place of the men, who were soon fatigued by the labor necessary to force the boat to any speed through the water. Dr. Brewster, speaking of the invention, says, "That this gentleman was the inventor of the steamboat in the strictest sense of the word I will not venture to affirm, but I have no hesitation in stating it as my decided opinion that he is more entitled to this distinction than any other individual who has been named." Dr. Brewster was not aware of the successful experiment of Fitch a year earlier.

The next and third boat propelled by steam within the waters of the United States was built this year, by James Rumsey, of Virginia, who had a long controversy with Fitch as to the priority of the application of steam as a moving power for vessels. Rumsey tried his boat at Shepherdstown, Virginia, on the 3d of December, 1787, and the success of his experiment is certified to by Major-General Horatio Gates, Rev. Robert Stubbs, and others. This boat was propelled by sucking in water at the bow and ejecting it at the stern. It moved at the rate of four miles an hour, but made only one trip, and probably did not go half a mile in distance.

1788.—In 1788, Rumsey carried his invention to England and procured a patent for it. He then succeeded in inducing a wealthy American merchant to join him, and began building a steamboat. It was all but completed when Rumsey suddenly died. His partners got the vessel afloat in February, 1793, and sailed her many times on the Thames, against wind and tide, with a speed of four knots an hour.

The thought of drawing water in at the bow and pushing it out at the stern was not new, and is said to have originated with Dr. Franklin, or to have come originally from France. Mr. Arthur Donaldson proposed it, also, to the Assembly of Pennsylvania in 1786.

Rumsey this year published a pamphlet entitled "A Short Treatise on the Application of Steam; whereby is clearly shown from *actual experiments* that steam may be applied to propel boats or vessels of any burthen, against rapid currents, with velocity, etc. By James Rumsey, of Berkeley County, Virginia. Philadelphia, printed by Joseph James, Chestnut Street, 1788."

The fourth steamboat in the United States was built in 1788, by John Fitch, and proved eminently successful. This boat was sixty feet long, and had eight feet beam. The oars or paddles were placed at the *stern*, and pushed against the water. The engine had a twelve-inch cylinder. About the end of July, 1788, she was propelled by

steam from Philadelphia to Burlington, some twenty miles, being the longest trip ever made by any boat under steam up to that time. On the 12th of October this boat took thirty passengers from Philadelphia to Burlington in three hours and ten minutes, a fact well authenticated by reliable certificates. Several other trips were made in 1788 and 1789.

About the middle of October, 1788, a boat, the joint production of Patrick Millar, James Taylor, and William Symington, propelled by steam, was put in motion on the Lake of Dalswinton, in Scotland. A successful and beautiful experiment. The vessel moved delightfully, and, notwithstanding the cylinders were only four inches in diameter, went at the rate of five miles an hour. The engine, in a strong oak frame, was placed in a pleasure-boat, the boiler being parallel to it on the opposite side of the vessel, and the paddles in the *centre* of the boat.

The vessel continued to ply for some days for the amusement of the projector, and to the astonishment of the country people, who assembled from all quarters to see a boat driven by *reik* (smoke). After these experiments the engine was removed into the library of Dalswinton House, where it stood for a long time as an ornamental model. In 1870 it was on exhibition in London.

Satisfactory as was the result of this experiment, it did not fulfill all the designs of the inventors. A model vessel even as large as theirs might succeed and still leave it doubtful whether a larger scale might not impair the efficiency of the contrivance. Their success determined them to make an expensive trial on a large scale. From this determination resulted their second steamboat, constructed in 1789.

1789.—The date of commencing this vessel is fixed by the following letter, the original of which is preserved in the Millar family:

"DUMFERLINE, 6th of June, 1789.

"GENTLEMEN,—The bearer, Mr. William Symington, is employed by me to erect a steam-engine for a double vessel, which he proposes to have made at Carron. I have therefore to beg that you will order the engine to be made according to his directions. As it is of importance that the experiment should be made soon, I beg, also, that you will assist him, by your orders to the proper workmen, in having it done expeditiously. I am ever, with great regard, gentlemen, your most obedient humble servant,

"PATRICK MILLAR.

"TO THE CARRON COMPANY, Carron."

It was proposed to make the second experiment on the Forth or Clyde Canal. For this purpose Mr. Millar's large twin or double pleasure-boat, the same he had previously used with paddle-wheels, driven by men, was sent up from Leith to the Forth and Clyde Canal, at Grangemouth, on the Frith of Forth, to receive the new steam-engine.

This double or twin vessel was sixty feet in length, and had cylinders to her engines of eighteen inches diameter. Her engine was in all respects a larger machine than the first, but identical in construction, and of about twelve horse-power. At the first trial the boards of the paddle-wheels were broken by the concussion of the engine, which rendered the experiment incomplete, but on the 26th of December, 1789, the experiment was repeated, and the vessel propelled at the rate of *seven* knots an hour. The next day the voyage was repeated with the same success. The vessel being a light skiff with plank less than an inch thick, as soon as the experiments were over was replaced on her original station as a pleasure-boat, and the engine deposited at the Carron Works.

The following account of this experiment, drawn up by Lord Cullen, was published in three of the Edinburgh newspapers: "It is with great pleasure I inform you that the experiment which some time ago was made upon the Great Canal here by Mr. Millar, of Dalswinton, for ascertaining the power of the steam-engine when applied to sailing, has lately been repeated with great success. Although these experiments have been conducted under a variety of disadvantages, as having been made with a vessel built for a different purpose, yet the velocity acquired was no less than six and a half to seven miles an hour.

"This sufficiently shows that with vessels properly constructed a velocity of eight or nine, or even ten, miles an hour may be easily accomplished, and the advantages of so great a velocity in rivers, straits, etc., and in cases of emergency, will be sufficiently evident, as there can be few winds, tides, or currents which can easily impede or resist it, and it will be evident that even with slower motion the utmost advantage must result to inland navigation."

1790.—In a petition "for an exclusive right to the use of steam navigation for a limited time," dated New York, June 22, 1790, addressed by John Fitch, of Philadelphia, to the Secretaries of War and State, and the Attorney-General of the United States, he states that "in the spring of 1785 he conceived the idea of applying steam to the purpose of propelling vessels through the water," and that "fully satisfied in his own mind of the practicability of such a scheme, he divested himself of every other occupation and undertook the arduous task;" that he had expended about eight thousand dollars in successive experiments, and that nearly four years of some of his grants of exclusive rights in several States, for the use of fire and steam in navigation, had expired before he was able to bring his engine to such a degree of perfection as to be carried into use. "That having at length fully succeeded in his scheme, proofs of which he is prepared to offer, he trusts he now comes forward not as an imaginary projector, but as a man who, contrary to the popular expectation, has clearly accomplished his design."

The fourth steamboat built in the United States not being considered fast enough, the steamboat company which had acquired an interest in

John Fitch's invention built a fifth, which was first tried December, 1789, about the time Millar was making his second successful experiment in Scotland. Her speed not proving satisfactory, various alterations were made in her machinery, until April, 1790, when the most complete success was attained. In May, General Mifflin and the whole Supreme Executive Council of Pennsylvania were passengers in her. The following account of this experiment is given by William Thornton, Esq., who was one of the company interested, and a passenger on board:

"The day was appointed, and the experiment made in the following manner. A mile was measured in Front Street (or Water Street) Philadelphia, and the bounds projected at right angles as exact as could, to the wharves, where a flag was placed at each end, and also a stop-watch. The boat was ordered under way at dead-water, or when the tide was found to be without movement; as the boat passed one flag it was struck, and at the same instant the watches were set off; as the boat reached the other flag it was also struck, and the watches instantly stopped. Every precaution was taken before witnesses, the time was shown to all, the experiment declared to be fairly made, and the boat was found to go at the rate of eight miles an hour, or one mile within the eighth of an hour. The Governor and Council of Pennsylvania were so highly gratified that, without their intentions being previously known, Governor Mifflin, attended by the Council in procession, presented to the Company, and placed in the boat, a superb silk flag, prepared expressly, which Mr. Fitch afterwards took to France and presented to the National Convention."

They were thus particular in ascertaining the exact speed of the boat, as on her going at the rate of *eight miles an hour* depended the assignment of her in shares to a company. It seems to be a little uncertain whether the silk flag presented contained the arms of Pennsylvania or was simply the flag of the United States.

The boat afterwards ran eighty miles in a day. She was placed upon the Delaware in the summer, and ran regularly as a packet, passenger, and freight boat for three or four months. Advertisements of her trips were published in the Philadelphia newspapers. Of these notices twenty-three have been found, giving advice of thirty-one trips to Trenton, Burlington, Chester, Wilmington, and Gray's Ferry. One of these advertisements, taken from *The Federal Gazette and Philadelphia Daily Advertiser* of Monday, July 26, 1790, is as follows. It will be seen it *was thought* sufficiently distinctive to call her *the* steamboat, since there was none other in the world at that time:

"THE

STEAMBOAT

Sets out to-morrow morning at ten o'clock, from Arch Street Ferry, in order to take passengers for Burlington, Bristol, Bordentown, and Trenton, and return next day.

"PHILADELPHIA, July 26th, 1790."

It is estimated that during the summer this steamboat passed over between two and three thousand miles. In the autumn she was laid up and never afterwards used, as there was not sufficient travel and transportation to pay the expense of running her.

Before this conclusion was arrived at the company had projected and commenced building another, intended for the navigation of the Mississippi, and called the "Perseverance." She was of twenty-five tons burden, and rigged schooner fashion. The boat was completed, and her engines nearly so, when she broke adrift in a storm from her fastenings at the wharf, and was blown on shore at Petty's Island, in the Delaware. Before she could be gotten off, the company in their attempts to simplify the machine had ruined it, and, moreover, had got into debt, which obliged them to sacrifice both boats and all the machinery.

1790.—William Longstreet, an American inventor, born in New Jersey, and who died in 1814, removed to Georgia. In 1790 he wrote a letter to Thomas Tolfairs, of Savannah, asking him to assist him in raising the means to construct a boat to be propelled by steam. This letter was published in the Savannah and Augusta, Georgia, newspapers, but the funds were not immediately obtained. He was subsequently furnished with the necessary means for experiment, and constructed a small model boat upon a plan very different from Fulton's, which went on the Savannah River against the stream five miles an hour.[6]

May 7, 1790, Earl Stanhope patented a *Janus*-shaped vessel, which he styled an "Ambi-navigator," with a propeller in the form of a duck's foot, worked by a twelve-horse cross-head engine, with double connecting-rods, which at the conclusion of the experiment was laid up in Deptford Dock-Yard. This engine, at least such portion of it as could be made available, was subsequently (in 1802) applied to the *first steam-dredge*, built for the Admiralty. The "Ambi-navigator" had also a novel description of rudder, styled by the inventor an "equipollant rudder."

1791.—Mr. John Fitch, at the request of Aaron Vail, Esq., consul at L'Orient, was sent by the company to France for the purpose of building steamboats. A brevet of invention was granted to Fitch on the 29th of November, 1791, for his invention, but in the "Description des Machines et Procédes specific dans les Brevets d'Inventions expires Paris, 1811," it is stated that Des Blancs had previously proposed a similar scheme, and that a model of his plan had been deposited in the "Conservatoire des Arts et Méteirs."

Mr. Vail, unable to obtain workmen to build the boats, paid the expenses of Mr. Fitch, who returned to the United States. Mr. Vail afterwards subjected to the examination of Mr. Fulton, when in France, the papers and designs of the steamboat appertaining to the company.

Mr. Fitch as early as this year predicted that sailing-vessels would soon be superseded in transatlantic navigation.

[6] Appleton's American Cyclopedia.

1791.—Colonel John C. Stevens, of Hoboken, New Jersey, commenced his experiments in steam navigation in 1791, and by careful study succeeded in mastering the theory and practice of the steam-engine. With this knowledge as a basis, he made further investigations, which resulted in the inventions above alluded to, the first practical tests of which proved so satisfactory that he at once set about developing his ideas in order to devote them to the public good. His first attempts were made with a rotatory engine, for which he substituted one of Watt's. His first engineer proved an incorrigible sot. His second became consumptive, and died before his experiment was completed. He then resolved to depend upon his own resources, and built a workshop on his own estate, where he employed workmen under his own superintendence. It has been claimed that he invented the first tubular boiler about 1804, but Nathan Reed took out a patent for one in 1790. With various forms of vessels and different modifications of propelling apparatus, he impelled boats at the rate of five or six miles per hour. They were in truth more perfect than any of his predecessors, but did not satisfy his own hopes and sanguine expectations.

1792.—Baron Seguier experimented with a submerged propeller.

1792.—The Historical Chronicle of the *Bee*, page 23, says, "Earl Stanhope's experiments for navigating vessels by the steam-engine, without masts or sails, have succeeded so much to his satisfaction on a small scale, that a vessel of two hundred tons burden on this principle is now building under his direction. The expense of this vessel is to be paid by the Navy Board in the first instance, on condition that if she do not answer after a fair trial, she shall be returned to Earl Stanhope, and all the expense made good by him."

A similar account of the earl's steam-vessel appeared in the *Gentlemen's Magazine* for October, 1792 (page 956), where it is stated that it was then being built under his direction by Mr. Stalkart, the author of a very valuable work on naval architecture. About this time Robert Fulton, then living at Torbay, in Devonshire, held some correspondence with Earl Stanhope on the subject of moving ships by a steam-engine.

1793.—The Earl of Stanhope, in 1793, revived the project of Genevois, and this machine, in 1795, was placed in a boat furnished with a powerful engine, and tried by him in Greenland Dock. In this experiment the paddles were two gigantic duck's feet, suspended from either side of the vessel, and opening and shutting like huge umbrellas. He was unable to obtain for his boat a greater velocity than three miles an hour. While engaged in this experiment he received a letter from Robert Fulton, who proposed the use of paddle-wheels; and it is probable his neglect to listen to this suggestion caused a delay in the introduction of the steamboat of at least twelve years, for it cannot be doubted that the ingenuity of Fulton, backed by the wealth and influence of Lord Stanhope, would have been as successful then as it was years later.

It is not known at what date Fulton's attention was first directed to the application of steam to navigation, but among the papers of Mr. Fulton, after his death, was found a letter from the Earl of Stanhope, dated at Holdsworthy, Devon, October 7, 1793, in which he says,—

"SIR,—I have received yours of the 30th of September, in which you propose to communicate to me the principles of an invention which you say you have discovered respecting the moving of ships by the means of steam. It is a subject on which I have made important discoveries. I shall be glad to receive the communication which you intend, as I have made the principles of mechanics my particular study," etc.

(To be continued.)

THE INFANTRY OF THE BRITISH ARMY.

THE infantry has perhaps obtained a more extended reputation in the world than any other branch of the British army. In every clime, in all the wars in which Great Britain has been involved, her foot soldiers have served and gained honorable distinction; almost the only general who could boast of having inflicted defeat, in any continuous form, upon the British infantry, was that extraordinary man to whose marvelous genius, valor, and rectitude of character your country owes its position among the ruling powers of the universe, the noble Washington. There was a time when America was a detested land in the eyes of Englishmen, when Americans were regarded by Englishmen as their most bitter foes. Thank God! such a time is now long past in the rolling tide of years, such a feeling comes to the Englishmen of to-day as but a tradition, and in this year of grace there are no people we Islanders are more pleased to meet than Americans, there is no land where we receive more hospitable welcome than America.

The infantry of the British army is composed of regiments of the Guard and regiments of the line. I ought to say that in our service the military term *regiment*, when used in reference to the infantry branch, is, in effect, a mere form of expression; it does not enable one to arrive at any definite conclusion as to its proper military meaning. For example, we speak of the Twenty-fifth Regiment and of the Twenty-sixth Regiment, but there is a wide distinction between the two corps, from a military point of view,—the Twenty-fifth Regiment has two battalions, and the Twenty-sixth Regiment has only one battalion. It would be well, perhaps, at the outset to inform you what regiments have one battalion and what more than one. The brigade of Foot Guards includes three regiments, namely, the "Grenadier Guards," the "Coldstream Guards," and the "Scots Guards." Of these, the first named has three battalions, the second and the third two battalions. In the line, the first twenty-five regiments have two battalions each, the remainder, with two exceptions, one battalion apiece. The exceptions are the Sixtieth "Royal Rifles" and the "Rifle Brigade," both of which regiments have four battalions each. With these two regiments included, the infantry of the line contains a hundred and forty-one battalions. In addition to these there are certain colonial and Indian

corps, but for the purpose of this article it will not be necessary to allude to them further. Besides *Rifles*, the infantry of the line counts certain regiments that are known by distinctive appellations, such as *Highlanders*, *Fusiliers*, and *Light Infantry*. It may be explained that *Light Infantry* are not any lighter in person or equipment than any other regiments; that *Fusiliers* do not carry any longer the old-fashioned weapon from which their name was derived; and that *Rifles* are no longer the only corps armed with weapons of precision. But that their dress is either wholly or partly different from the uniform of other regiments, these especially designated corps have nothing peculiar about them. As a rule the distinctive titles have been granted as especial marks of the sovereign's favor in recognition of some extraordinary service performed. Fusiliers wear grenades on their tunic collars and on their forage-caps, and, in full dress, black, hairy busbies lend them additional stature and pomp. It is interesting to note that the officers and sergeants of the Twenty-third Regiment, "The Royal Welsh Fusiliers," wear, pendent to their collars down the back of their tunics, a bow of black watered silk, called "a *flash*," in memory of theirs having been the last regiment to abolish pigtails (they were in America at the time), the "flash" being a piece of ribbon placed under the pigtail to prevent the white powder soiling the coat-collar. *Light Infantry* regiments used to wear dark green shakos with green plumes; now, alas! our only distinction is that we wear dark green cloth helmets instead of blue cloth helmets, and green forage-caps with the badge of a bugle in front. The glory of the "Light Bobs" is departed! There are nine "Fusilier" regiments, numbered as the 5th, 7th, 21st, 23d, 87th, 101st, 102d, 103d, and 104th, and ten of "Light Infantry," which are numbered the 13th, 32d, 43d, 51st, 52d, 68th, 85th, 90th, 105th, and 106th. The "Highland" regiments wear the Scotch national costumes; some the kilt, etc., and others the trews, etc. The 42d, 78th, 79th, 92d, and 93d Regiments wear the kilt and the Highland bonnet cap plumed with black ostrich feathers; the 71st, 72d, 74th, and 91st wear "trews" (trousers of parti-colored cloth), and of these regiments, the 71st, 74th, and 91st have a cap of especial pattern, the 72d only being privileged to wear the Highland plumed bonnet; the 25th, 26th, 73d, and 75th Regiments, in token of their Scotch origin, wear a forage-cap with a band of a chequered pattern. Then there are certain regiments, some of which have been mentioned before, termed *Royal*, as a mark of the sovereign's favor and esteem, or are, perhaps, called the "King's" or "Queen's." These are the 1st, 2d, 4th, 6th, 7th, 8th, 13th, "Prince Albert's," 18th, 21st, 23d, 25th, 35th, 42d, 50th, 51st, 79th, 85th, 86th, 87th, 100th, 101st, 102d, and 103d Regiments. They wear dark blue collars and cuffs on their tunics, and scarlet bands round their forage-caps, except in the cases of Scotch regiments.

To return to the organization of infantry battalions.

A battalion consists of ten companies, eight of which are on service and two at the depot, as a rule. The officers are one lieutenant-colonel, two majors, ten captains, and from fourteen to twenty subalterns. The staff-officers comprise an adjutant (one of the subalterns), an instructor of musketry, who is assisted in his duties by another officer (both taken from the subalterns), a quartermaster, who ranks with lieutenants, and a paymaster and surgeon, who are attached to the battalion from their own departments. The non-commissioned officers are one sergeant-major, one schoolmaster (sometimes), one quartermaster sergeant, one sergeant instructor of musketry, one band-master sergeant, one drum-major (in "light infantry" regiments and "rifles" this non-commissioned officer is called *bugle*-major, and in Highland regiments *pipe*-major), one paymaster sergeant, one armorer sergeant, one hospital sergeant, one (or more) orderly room-clerk, one sergeant master-tailor, one sergeant cook, ten color sergeants, one band sergeant, forty sergeants, one corporal of band, one corporal of pioneers, forty corporals, and a number of lance corporals (private soldiers on probation for promotion). Then there are about twenty musicians, and twenty drummers and buglers (the *latter* only in *Light Infantry* and *Rifles*), and in Highland regiments five pipers. To each company there is a pioneer attached, and there are about five hospital orderlies. The private soldiers bring the full strength of a battalion up to rather more than a thousand men all told,—that is, *on paper*, but it cannot be said that it is the fact. However, in case of necessity, militiamen would volunteer in sufficient numbers to raise the strength of the line to its proper standard. The infantry of the line is armed with the Martini-Henry rifle and the long bayonet. Staff sergeants wear swords, other sergeants carry the short rifle and sword-bayonet. The cost of equipment, clothing, etc., for a battalion of infantry of the line amounts to rather more than eleven thousand pounds sterling,—that, of course, does not include any expenses of the officers' incurrence; the British officer pays for nearly everything he has out of his own pocket,—the estimate given is for the British public to settle. The "necessaries," as the articles of equipment are termed, are obtained on a requisition being made to the Secretary of State for War, and as soon as they are received a board of officers is assembled to inspect them. All "necessaries" are under the charge of the quartermaster, who issues them to the different companies on their captain's requisition. A soldier on joining is supposed to receive a free kit complete in necessaries, which he must maintain at his own expense. Certain articles are given him at certain periods at the public expense. If he make away with or lose by willful neglect any article of his kit, a court-martial will try him and deal with him severely. The uniform of the British infantry soldier is, in the Guards and all line regiments, excepting Rifles and Highland regiments, a scarlet tunic, and black or blue trousers with red stripes. Rifles wear dark

green uniforms; Highlanders wear scarlet jackets of peculiar pattern, and kilts or trews, as above mentioned. The Guards wear a big bear-skin cap with a plume in the side; a white plume on the left side by the "Grenadiers"; a red one on the right side by the "Coldstreams," and the "Scots" wear none at all. Each regiment is known by its number, worn in some conspicuous part of the uniform, by its "facings," and, in addition in some instances, by especial badges. I have mentioned which regiments have dark blue "facings," I will now detail the "facings" worn by other regiments of the line. (The Guards have blue facings, being, *de facto*, royal.) The 9th, 10th, 12th, 15th, 16th, 20th, 26th, 28th, 29th, 30th, 34th, 37th, 38th, 44th, 46th, 57th, 67th, 72d, 75th, 77th, 80th, 82d, 83d, 84th, 88th, 91st, 92d, 93d, 95th, 96th, and 99th Regiments have *yellow* "facings." I should say that those corps which have any Scotch origin and have "facings" *yellow*, have that color because it was the national regal color. The 3d, 14th, 22d, 27th, 31st, 40th, 48th, 52d, 61st, 62d, 71st, 78th, 81st, 90th, and 105th Regiments have *buff* "facings." Divers shades of *green* are worn by the 5th, 11th, 19th, 24th, 36th, 39th, 45th, 49th, 54th, 55th, 63d, 66th, 68th, 69th, 73d, and 94th Regiments. *White* "facings" lend a cleanly appearance to the uniforms of the 17th, 32d, 41st, 43d, 47th, 59th, 65th, 74th, 98th, 106th, 107th, and 109th Regiments. The 58th, 64th, 70th, and 89th Regiments have *black velvet* "facings." The 33d, 53d, and 76th Regiments *scarlet* "facings." The 56th *purple*. The 97th *sky-blue*. The 104th *deep blue*. The 108th *pale yellow*. Each battalion has a pair of "colors" (standards),—the one known as the *regimental* color, and the other as the *queen's*. The regimental color is of silk of the same color as the "facings," the queen's is in all cases the "Union Jack," with the crown and regimental number in the centre. Both are fringed with gold, and on the regimental color are the "Union Jack" in the top corner nearest the staff, the badge and number in the centre, and the "honors," or names of battles, campaigns, etc., on scrolls stitched on to the body of the flag. There are certain exceptions to the general rule regarding the pattern of "colors,"—for instance, the rifle regiments carry none at all,—but it will not be necessary to pursue the subject at greater length.

Commissions in the infantry, as in the cavalry, are obtained in two ways,—by open competition, or through the militia; and I might add that a certain number of commissions are given to students at Oxford and Cambridge Universities on certain conditions.

The age for a candidate for a commission in the cavalry and infantry, by open competition, is from seventeen to nineteen; and for the militia officer, from nineteen to twenty-two. For West Indian regiments this is extended to twenty-five.

The examination for those seeking admittance by competition is severe; and, as there are many trying for each vacancy, the competitor

has to be thorougly conversant with each subject he may take up to secure any chance of success. The subjects set are absolutely ridiculous, and entirely useless, for any one adopting the profession of arms: they would better suit, by far, a candidate for Holy Orders. Candidates *cram* (as they term it) for the examination, and forget all they have learnt as soon as the ordeal is passed.

Naturally, the candidates, by open competition, who are successful, have, on obtaining their commissions, to begin at the very A, B, C of their professional lesson, and for some time they are, if ornamental, still perfectly useless members of the army.

With the officers who obtain entrance into the line from the militia it is different. In the first place, from the fact of their having obtained commissions in the old aristocratic militia force, they are *gentlemen*, which cannot be said, with such general application, of those who essay entrance into the army by competition. In the second place, owing to the examinations they have been obliged to pass, in professional subjects, prior to their being allowed to go up for transfer to the line, the militia candidates are fit to take up the active duties of their profession as soon as they are gazetted to their new corps. Up to a recent period, colonels commanding militia regiments had the right of nominating, every year, one of their subalterns for a commission in the line. The nominee had then to pass a certain qualifying examination, and so obtain his transfer.

This system was all very well but for the fact that it opened the door for injustice and malpractice on the part of the colonels, who too often nominated, out of their turn, their private friends or family connections, to the prejudice of the service and the ruin of many an excellent officer.

Now each militia subaltern, qualified by age, service, and military proficiency, states his intentions to go up for a commission in the line, and, at certain periods in the year, a competitive examination of all these gentlemen is held for a certain number of vacancies assigned especially to militia officers.

In old times, every militia officer who brought a certain number of his men with him was given a commission in the regular army; and that was undoubtedly the very best means possible of obtaining the best officers and the best men for the army.

Of course, there is no similar rule made with regard to volunteer officers. It would be impossible, for this reason: the officers of volunteer regiments or corps are, as a rule, persons in trade, who are not possessed of the requisite social standing, and hardly any of them have any knowledge of military duties, or of anything that stamps the *soldier*.

It may be said, *en passant*, that neither Americans, Russians, French, nor any other nationalities, need fear or pay any attention to the blatant mention or boast of our volunteer force.

Under the circumstances of their regulations, and of the manner in which they are officered, the volunteers compose merely an armed disorganized mob, which would be an encumbrance to the fighting troops if they could be brought into the battle-field, which, very fortunately, *can't* be done. Of course, as men, they are as *brave* as any other body of the community, but, as *soldiers*, they are not only entirely useless, but a sad drain upon the resources of the country.

Foreign countries may safely regard the existence of the volunteers in Great Britain as a weakening rather than as a strengthening element in the country's military position.

Mention has been made, in a former article, of the purchase system once acted upon in English administration of the military service. Although that iniquitous system has fortunately died a sudden death, it will not be out of place here to quote the regulation prices of commissions in the infantry when the demon Purchase acted as a barrier to the attainment of a proper state of efficiency in the army.

The following table will put the readers of this article in possession of the facts as concisely as is possible:

Foot Guards.[1]—Ensign and lieutenant, £1200; lieutenant and captain, £2050; captain and lieutenant-colonel, £4800; major and colonel, £4800; lieutenant-colonel and colonel, £4800.

Infantry of the Line.—Ensign, £450; lieutenant, £700; captain, £1800; major, £3200; lieutenant-colonel, £4500.

You will say, "These are very large sums for the article," but you would be amazed if you learned how much larger were the prices demanded and paid by officers in addition to the regulation cost quoted above. How this system worked, so far as efficiency was concerned, in the days when it was at the height of its glory, and, let us add, its iniquity, may be imagined when I tell of a single ludicrous instance.

A *baby* in the arms of its nurse was brought upon parade one day to see its regiment and to *earn* its pay,—the presence of all officers being obligatory on certain days in the year, known as *muster-days*. The infant Mars held the rank of major, all the intervening steps having been ascended by the aid of gold.

There were many boys at my old school, Westminster (not when I was there, but some time before my school-days), who were captains, field-officers, or subalterns in the army, and were obliged to go through *amo* and *mensa*, and suffer the discipline of the rod, just the same as their civilian contemporaries. And yet there are people who rave in their cups about the "Queen and constitushun," and deplore, with Bacchanalian tears in their eyes, the abolition of Purchase in the army.

An English sovereign once said that he could make an ambitious seeker of the royal favor, who was of plebeian birth, a *noble* man, but he couldn't make him a *gentleman*.

[1] The superior rank attached to each grade is *army* rank.

So, also, English *sovereigns* (excuse the vile pun) could make a man an *officer*, but they couldn't make him a *soldier*.

Just lately I have been reading an account of some actions of daring bravery and extraordinary skill performed by your great soldier (or rather *one* of your great soldiers), General Burnside, and I said to myself, "*Purchase* had nothing to do with producing *that* general." The passing mention of gallant actions brings home to me the fact that I commenced this article with the intention of picking out some instances of the kind, to place before my readers as examples of what has been done by British infantry, and, unless I commence the recital forthwith, there will be no room left to collect these facts within the boundaries of this contribution. Glance at this list, in alphabetical order, of the battles, minor fights, and campaigns that comprise the "honors" on the colors or appointments of British infantry regiments, and you will find a series of terse, pithy legends of glorious deeds of arms. Let me add that these range from a certain period, anterior to which many actions had been fought which would in more modern times have entitled the regiments sharing in them to inscribe them on the silken symbols.

Abyssinia.—4th, 26th, 33d, 45th.

Aden.—103d.

Afghanistan.—2d, 13th, 17th, 101st.

Albuhera.—3d, 7th, 23d, 28th, 29th, 31st, 34th, 39th, 48th, 57th, 60th, 66th.

Aliwal.—31st, 50th, 53d.

Alma.—Grenadier Guards, Coldstream Guards, Scots Guards, Rifle Brigade, 1st, 4th, 7th, 19th, 20th, 21st, 23d, 28th, 30th, 33d, 38th, 41st, 42d, 44th, 47th, 49th, 50th, 55th, 63d, 68th, 77th, 79th, 88th, 93d, 95th.

Almaraz.—50th, 71st, 92d.

Amboyna.—102d.

Arabia.—65th.

Arcot.—102d.

Arroyo dos Mollinos.—34th.

Assaye.—74th, 78th.

Ashantee.—Rifle Brigade, 23d, 42d, 1st West India, 2d West India.

Ava.—1st, 13th, 38th, 41st, 44th, 45th, 47th, 54th, 87th, 89th, 102d.

Badajoz.—Rifle Brigade, 4th, 5th, 7th, 23d, 27th, 30th, 38th, 40th, 43d, 44th, 45th, 48th, 52d, 60th, 74th, 77th, 83d, 88th, 94th.

Banda.—102d.

Balaclava.—93d.

Barrosa.—Grenadier Guards, Coldstream Guards, Scots Guards, Rifle Brigade, 28th, 67th, 87th.

Beni Boo Ally.—103d.

Bhurtpore.—14th, 59th, 101st.

Bladensburg.—4th, 21st, 44th, 85th.

Bourbon.—69th, 86th.

Busaco.—Rifle Brigade, 1st, 5th, 9th, 38th, 43d, 45th, 52d, 74th, 83d, 88th.

Bushire.—64th, 106th.

Buxar.—101st, 103d.

Cabul (1842).—9th, 13th, 31st, 40th, 41st.

Candahar.—40th, 41st.

Canton.—59th.

Cape of Good Hope.—24th, 59th, 71st, 72d, 83d, 93d.

Carnatic.—103d.

Central India.—71st, 72d, 80th, 83d, 86th, 88th, 59th, 108th, 109th.

Chillianwallah.—24th, 29th, 61st, 104th.

China.—18th, 26th, 49th, 55th, 98th.

Ciudad Rodrigo.—Rifle Brigade, 5th, 43d, 45th, 52d, 60th, 74th, 77th, 83d, 88th, 94th.

Condore.—102d.

Copenhagen.—Rifle Brigade, 49th.

Corunna.—Grenadier Guards, Rifle Brigade, 1st, 2d, 4th, 5th, 6th, 9th, 14th, 20th, 23d, 26th, 28th, 32d, 36th, 38th, 42d, 43d, 50th, 51st, 52d, 59th, 71st, 81st, 91st, 92d.

Deig.—101st.

Delhi.—8th, 52d, 60th, 61st, 75th, 101st, 104th.

Detroit.—41st.

Dominica.—46th, 1st West India.

Douro.—3d, 48th, 66th.

Egmont-op-Zee.—1st, 20th, 25th, 49th, 63d, 79th, 92d.

Egypt.—Coldstream Guards, Scots Guards, 1st, 2d, 8th, 10th, 13th, 18th, 20th, 23d, 24th, 25th, 26th, 27th, 28th, 30th, 40th, 42d, 44th, 50th, 54th, 58th, 61st, 79th, 80th, 86th, 88th, 89th, 90th, 92d, 96th.

Ferozeshah.—9th, 29th, 31st, 50th, 62d, 80th, 101st.

Fuentes d'Onore.—Rifle Brigade, 24th, 42d, 43d, 45th, 51st, 52d, 60th, 71st, 74th, 79th, 83d, 85th, 88th, 92d.

Gibraltar.—12th, 38th, 56th, 58th.

Ghuznèe.—2d, 13th, 17th, 40th, 41st, 101st.

Goojerat.—10th, 24th, 29th, 32d, 53d, 60th, 61st, 103d, 104th.

Guadeloupe.—15th, 63d, 70th, 90th, 1st West India.

Guzerat.—101st, 103d.

Hindoostan.—17th, 36th, 52d, 71st, 72d, 76th.

Hyderabad.—22d.

India.—12th, 14th, 65th, 67th, 69th, 75th, 84th, 86th.

Inkerman.—Grenadier Guards, Coldstream Guards, Scots Guards, Rifle Brigade, 1st, 4th, 7th, 19th, 20th, 21st, 23d, 28th, 30th, 33d, 38th, 41st, 44th, 47th, 49th, 50th, 55th, 57th, 63d, 68th, 77th, 88th, 95th.

Java.—14th, 59th, 69th, 78th, 89th.

Jellalabad.—13th.

Khelat.—2d, 17th.

Kirkee.—103d.

Koosh-ab.—64th, 78th, 106th.

Lincalles.—Grenadier Guards, Coldstream Guards, Scots Guards.

Lucknow.—Rifle Brigade, 5th, 8th, 10th, 20th, 23d, 32d, 34th, 38th, 42d, 53d, 64th, 75th, 78th, 79th, 82d, 84th, 90th, 93d, 97th, 101st, 102d.

Maharajpore.—39th, 40th.

Maheidpore.—1st, 102d.

Maida.—20th, 27th, 35th, 58th, 61st, 78th, 81st.

Mandora.—90th, 92d.

Mangalore.—73d.

Marabout.—54th.

Martinique.—7th, 8th, 13th, 15th, 23d, 25th, 60th, 63d, 90th, 1st West India.

Meeanee.—22d.

Miami.—41st.

Minden.—12th, 20th, 23d, 25th, 37th, 51st.

Monte Video.—Rifle Brigade, 38th, 40th, 87th.

Moodkee.—9th, 31st, 50th, 80th.

Mooltau.—10th, 32d, 60th, 103d.

Moro.—56th.

Mysore.—103d.

Nagpore.—1st.

New Zealand.—12th, 14th, 18th, 40th, 43d, 50th, 57th, 58th, 65th, 68th, 70th, 96th, 99th.

Niagara.—1st, 6th, 8th, 41st, 82d, 89th, 100th.

Nieuport.—53d.

Nive.—Rifle Brigade, 1st, 3d, 4th, 9th, 11th, 28th, 31st, 32d, 34th, 36th, 38th, 39th, 42d, 43d, 50th, 52d, 57th, 59th, 60th, 61st, 62d, 66th, 71st, 76th, 79th, 84th, 85th, 91st, 92d.

Nivelle.—Rifle Brigade, 2d, 3d, 5th, 6th, 11th, 23d, 24th, 27th, 28th, 31st, 32d, 34th, 36th, 39th, 40th, 42d, 43d, 45th, 48th, 51st, 52d, 53d, 57th, 58th, 60th, 61st, 66th, 68th, 74th, 79th, 82d, 83d, 87th, 88th, 91st, 94th.

Nundy Droog.—102d.

Orthes.—Rifle Brigade, 5th, 6th, 7th, 11th, 20th, 23d, 24th, 27th, 28th, 31st, 32d, 34th, 36th, 39th, 40th, 42d, 45th, 48th, 50th, 51st, 52d, 58th, 60th, 61st, 66th, 68th, 71st, 74th, 82d, 83d, 87th, 88th, 91st, 92d, 94th.

Pegu.—18th, 51st, 80th, 101st, 102d, 104th.

Pekin.—1st, 2d, 60th, 67th, 99th.

Peninsula.—Grenadier Guards, Coldstream Guards, Scots Guards, Rifle Brigade, 1st, 2d, 3d, 4th, 5th, 6th, 7th, 9th, 10th, 11th, 20th,

23d, 24th, 27th, 28th, 29th, 30th, 31st, 32d, 34th, 36th, 37th, 38th, 39th, 40th, 42d, 43d, 44th, 45th, 47th, 48th, 50th, 51st, 52d, 53d, 57th, 58th, 59th, 60th, 61st, 62d, 66th, 67th, 68th, 71st, 74th, 76th, 77th, 79th, 81st, 82d, 83d, 84th, 85th, 87th, 88th, 91st, 92d, 94th, 96th.

Persia.—64th, 78th, 106th.

Plassey.—39th, 101st, 102d, 103d.

Pondicherry.—102d.

Punjaub.—10th, 24th, 29th, 32d, 53d, 60th, 61st, 98th, 103d, 104th.

Punniar.—3d, 50th.

Pyrenees.—2d, 3d, 6th, 7th, 11th, 20th, 23d, 24th, 27th, 28th, 31st, 32d, 34th, 36th, 39th, 40th, 42d, 45th, 48th, 50th, 51st, 53d, 57th, 58th, 60th, 61st, 66th, 68th, 71st, 74th, 79th, 82d, 91st, 92d.

Queenstown.—41st, 49th.

Reshire.—64th, 106th.

Roleia.—Rifle Brigade, 5th, 6th, 9th, 29th, 32d, 36th, 38th, 40th, 45th, 60th, 71st, 82d, 91st.

Salamanca.—Rifle Brigade, 1st, 2d, 4th, 5th, 7th, 9th, 11th, 23d, 24th, 27th, 30th, 32d, 36th, 38th, 40th, 43d, 44th, 45th, 48th, 51st, 52d, 53d, 58th, 60th, 61st, 68th, 74th, 79th, 83d, 88th, 94th.

Scinde.—22d.

Seringapatam.—12th, 33d, 73d, 74th, 75th, 77th, 94th, 103d.

Sevastopol.—Grenadier Guards, Coldstream Guards, Scots Guards, Rifle Brigade, 1st, 3d, 4th, 7th, 9th, 13th, 14th, 17th, 18th, 19th, 20th, 21st, 23d, 28th, 30th, 31st, 33d, 34th, 38th, 39th, 41st, 42d, 44th, 46th, 47th, 48th, 49th, 50th, 55th, 56th, 57th, 62d, 63d, 68th, 71st, 72d, 77th, 79th, 82d, 88th, 89th, 90th, 93d, 95th, 97th.

Sholingur.—102d.

Sobraon.—9th, 10th, 29th, 31st, 50th, 53d, 62d, 80th, 101st.

St. Lucia.—1st, 27th, 53d, 64th.

St. Sebastian.—1st, 4th, 9th, 38th, 47th, 59th.

Surinam.—64th.

Taku Forts.—1st, 2d, 3d, 31st, 44th, 60th, 67th.

Talavera.—Coldstream Guards, Scots Guards, 3d, 7th, 24th, 31st, 40th, 48th, 53d, 60th, 61st, 66th, 83d, 87th, 88th.

Tarifa.—47th, 87th.

Ternate.—102d.

Toulouse.—Rifle Brigade, 2d, 5th, 7th, 11th, 20th, 23d, 27th, 36th, 40th, 42d, 43d, 45th, 48th, 52d, 53d, 60th, 61st, 74th, 79th, 83d, 87th, 88th, 91st, 94th.

Tournay.—14th, 37th, 53d.

Vimiera.—Rifle Brigade, 2d, 5th, 6th, 9th, 20th, 29th, 32d, 36th, 38th, 40th, 43d, 45th, 50th, 52d, 60th, 71st, 82d, 91st.

Vittoria.—Rifle Brigade, 1st, 2d, 4th, 5th, 6th, 7th, 9th, 20th, 23d,

24th, 27th, 28th, 31st, 34th, 38th, 39th, 40th, 43d, 45th, 47th, 48th, 50th, 51st, 52d, 53d, 57th, 58th, 59th, 60th, 66th, 68th, 71st, 74th, 82d, 83d, 87th, 88th, 92d, 94th.

Waterloo.—Grenadier Guards, Coldstream Guards, Scots Guards, Rifle Brigade, 1st, 4th, 14th, 23d, 27th, 28th, 30th, 32d, 33d, 40th, 42d, 44th, 51st, 52d, 69th, 71st, 73d, 79th, 92d.

Wilhelmstahl.—5th.

Wyndewash.—102d.

The total of the "honors" in the foregoing list reaches the magnificent number of *one hundred and seventeen*, and of these, the Rifle Brigade is entitled to more than any other regiment, the number inscribed on the appointments of that gallant corps being *twenty-three*.

Only three regiments of infantry have not shared in the fighting that has entitled their more fortunate fellow-regiments to point to the above "honors" with becoming pride. The three regiments whose colors are as yet bare of these distinguished badges are the 16th, 105th, and 107th.

With a view of aiding recruiting, *county* titles were bestowed on certain regiments in 1782; it being considered that the fact of a corps having a nominal association with a particular county would induce lads belonging to such county to enlist in the regiment bearing its name.

Lord Cardwell, when in the government, endeavored to carry this theory into more extended practice and efficiency by instituting the system of brigade depots throughout the country, through which means he hoped to succeed in almost entirely recruiting regiments from their own counties. We should be pleased to find so excellent a scheme resulting in the realization of the intention that promoted it; and, perhaps, in course of time, this *desideratum* will be attained.

There is not a regiment in the whole British army more distinguished for valor on the field of battle, for excellence of discipline on the march and in camp or quarters, than the Twenty-third "Royal Welsh Fusiliers."

If the brigade of the Royal Guards were formed of regiments selected for conspicuous gallantry and good conduct, then the brave *Welsh Fusiliers* would be the first corps in the British service. Neither in honor gained on the battle-field, nor in credit on the parade, nor yet in point of behavior from a disciplinary and soldier-like view, can all the Guards or any of the Guards approach the Twenty-third Regiment.

At all times in our history, on every occasion when this most distinguished regiment has been called upon to take its post in the forefront of battle, the Royal Welsh battalions have not only done their *duty*, but have earned the applause of their countrymen for many valorous actions which may be said to have been outside and beyond mere *duty*.

The Twenty-third, as likewise the Fifth and Seventh Fusiliers, owe their origin to King James the Second, who raised these regiments close upon two hundred years ago. Charles the Second originated the standing army of England; among the earliest formed regiments of infantry being the Third, or "Buffs," which most distinguished corps, with the London militia, are the only regiments entitled to the privilege of marching through the *city* of London with drums beating and bayonets fixed.

To the Twenty-third "Royal Welsh Fusiliers" was accorded the privilege of being the first to land in the Crimea, in the Russian war, and the first to exchange shots with the enemy,—the present general, Sir Daniel Lysons, K.C.B., late quartermaster-general, being the officer in command of No. 1 company, which was the detachment of the Royal Welsh landed on that occasion.

Here are two instances of the trust reposed in the Twenty-third Regiment by the superior officers of the British army. At the battle of the Alma the *regimental color* of the Seventh "Royal Fusiliers" was found, by Sir George Brown's aide-de-camp, in the hands of a private soldier lying on the ground. Captain Pearson took the standard to Major-General Codrington, who, finding that there was no officer of the Seventh Regiment near, desired the aide-de-camp to give it to Captain Bell, of the Twenty-third (who, by the way, gained the "Victoria Cross" that day), saying, "It cannot be in safer keeping than with the *Royal Welsh.*"

The other instance occurred in the Peninsula war. The Fourth Division of the British army, being the rear-guard stationed at Aleba del Ponte, was attacked by the French. It held its position until nightfall, and then retired in the direction of Soita. In reply to Wellington's request "for a stop-gap regiment to cover the retreat of the division," Major-General Pakenham said, "I have already placed the Royal Welsh Fusiliers there;" upon which Wellington remarked, in great delight, "That's the very thing."

How gallantly the Eleventh, Fifty-third, and Sixty-first Regiments, which formed Major-General Hulse's brigade, fought at Salamanca may be imagined when we read that only *nine* officers and *three hundred* men survived that glorious day!

The extract from the *London Gazette* of the 26th August, 1842, which I quote here, tells us why the Thirteenth Regiment wear a particular badge, and how they became a *Royal* regiment: "In consideration of the distinguished gallantry displayed by the Thirteenth Light Infantry during the campaigns in the Burmese empire and in Afghanistan (1824–26; 1841–42), Her Majesty has been graciously pleased to approve of that regiment assuming the title of *Prince Albert's Light Infantry*, and of its *facings* being changed from *yellow* to *blue.* Her Majesty has also been pleased to authorize the Thirteenth Regiment to-

bear on its *colors* and *appointments* a *mural crown*, superscribed *Jellalabad*, as a memorial of the fortitude, perseverance, and enterprise evinced by that regiment during the blockade of Jellalabad."

The Fortieth Regiment gained celebrity under Sir William Nott in the Afghan campaign of 1842, and the corps has always since been well spoken of in connection with Candahar.

The stolid patience and valor displayed by the British infantry on the plains of Waterloo is well known, and the numerous instances of personal gallantry need no repetition here. On that famous 18th of June one hundred and thirty-nine officers of the British army were *killed*, and five hundred and eighty-five *wounded;* which items speak for themselves.

Albuhera bore testimony—*bloody* testimony, too—to the good qualities of the British infantry in battle. From nine o'clock in the morning until two in the afternoon the god of war reigned triumphant over the Albuhera, and Death accompanied Mars. How the Fusilier Brigade, consisting of two battalions of the Seventh Regiment and one battalion of the Royal Welsh, charged the enemy has been grandly described by Sir William Napier, whose words I borrow: "A fearful discharge of grape from all the French artillery whistled through the British ranks. Myers was killed; Cole and the three colonels—Ellis, Blakeney, and Hawkshawe—fell wounded, and the Fusilier battalions, struck by the iron tempest, reeled and staggered like sinking ships. But, suddenly and sternly recovering, they closed on their terrible enemies, and then was seen with what a strength and majesty the British soldier fights. In vain did Soult, by voice and gesture, animate his Frenchmen. In vain did the hardiest veterans, extricating themselves from the crowded columns, sacrifice their lives to gain time for the mass to open out on such a fair field. In vain did the mass itself bear up, and fiercely striving, fire indiscriminately upon friends and foes, while the horsemen, hovering on the flanks, threatened to charge the advancing line. *Nothing* could stop that astonishing infantry. No sudden burst of undisciplined valor, no nervous enthusiasm weakened the stability of their order. Their flashing eyes were bent on the dark columns in their front. Their measured tread shook the ground. Their dreadful volleys swept away the head of every formation. Their deafening shouts overpowered the dissonant cries that broke from all parts of the tumultuous crowd, as, slowly and with a horrid carnage, it was pushed, by the incessant vigor of the attack, to the farthest edge of the height. There the French reserve, mixing with the struggling multitude, endeavored to sustain the fight, but the effort only increased the irremediable confusion. The mighty mass gave way, and, like a loosened cliff, went headlong down the steep. The rain flowed after in streams discolored with blood. Fifteen hundred unwounded men—the remnant of six thousand—stood triumphant on the fatal hill."

To illustrate the terrible loss sustained by the Fusilier Brigade we mention one fact. The company of the Twenty-third that went into action under the command of Captain Stainforth came out headed by a corporal, one Thomas Robinson.

It was on this memorable occasion that the Fifty-seventh Regiment won the name by which they are known throughout the service to this day, the *Die-hards*,—they fell as they fought, in their ranks, shoulder to shoulder, and were brought out of action by a subaltern. Of the Twenty-ninth Regiment, only two captains, a few subalterns, and ninety-six men remained at the close of the day. Every field-officer of the brigade formed by the Twenty-ninth, Forty-eighth, and Fifty-seventh Regiments was killed or wounded, and it was commanded on the cessation of hostilities by one of the captains of the Forty-eighth, whose name was Cemetiere, and who oddly enough was a *Frenchman*.

I should like to refer to many other actions in the wars of the Peninsula, the Crimea, and India, besides many other scenes of fighting, where glory has been reflected upon the colors of the British infantry. I would that space permitted me to dwell upon the doings of the force commanded by that great soldier and good man, the late Sir Henry Havelock! I would that I had room to tell how the *son* of that famous general, who is now known as Sir Henry Havelock-Allan, Bart., with whom I have the honor of acquaintance, proved himself the worthy son of a worthy father on many a battle-field,—how he won the badge of unfading honor, the "Victoria Cross," and how he has so often proved in his own person the value and pluck of the British infantry soldier!

Ex uno disce omnes,—or, at all events, the *great majority*.

Insignificant, at all times, in *numbers*, as the British army has been,—miserably small as it now is, when compared with the army of any other European power,—still I believe and hope that in the future as in the past the soldiers of the army of Great Britain will earn the gratitude of their countrymen and the applause of their posterity for the valorous performance of duty whenever called upon to face the enemy.

That this will be who can doubt, so long as it can be said of the British infantry soldier who meets his death in battle, as was said of Siward's son's death in Shakspeare's "Macbeth"? To Siward's inquiry, "Had he his hurts before?" Rosse replied, "Ay, on the *front*."

Then said the old man,—

> "Why, then, God's soldier be he!
> Had I as many sons as I have hairs,
> I would not wish them to a fairer death.
> And so his knell is knolled."

PHILIP H. B. SALUSBURY,
Captain First Royal Cheshire Light Infantry.

THE LOSS OF THE "ONEIDA."

[This article (in a condensed form) appeared in the September (1880) number of *Scribner's Monthly.*

By permission of the editor of that magazine the part containing the complete analysis of the evidence is here produced, where it will find readers more familiar with the technical phraseology of the original manuscript.—ED.]

THIS sad event occurred ten years ago, on the 24th of January, 1870, and it may well be asked, why now revive any remembrance of it? A single paragraph from the decision of the British naval court of inquiry held at the time will satisfactorily answer the question.

"We find from the evidence before us, that on a dark but starlight night, the 24th of January last, the British steamship 'Bombay,' *through no fault of her commander, Mr. Eyre,* came into collision with the U. S. corvette 'Oneida' in the close vicinity of Saratoga Spit, situated some ten miles from Yokohama." But the accident occurred through the fault of some one, and as it is implied that the "Oneida" was to blame, my object in writing this article is to present such portions of the evidence as will enable every one to judge for himself which was the culpable party.

The "Oneida" was a wooden screw-steamer of six hundred and ninety-five tons, two hundred and eleven feet in length, thirty-four feet beam, bark-rigged, with a battery of eight 8-inch guns, and a complement of twenty-four officers and one hundred and fifty-two men.

After being employed on blockade duty during our late civil war, she was dispatched in 1867 to the Asiatic station. It was at the close of a three years' cruise on this station, when homeward bound, that she was sunk in the Bay of Yedo, Japan, carrying down with her twenty officers and ninety-five men.

About 5 P.M. of the day in question, having weighed anchor from Yokohama harbor, she proceeded down the bay under all sail and easy steam at the rate of seven knots per log. The course on passing the light-ship was set S. by E. ¼ E. per standard compass. The weather was fine, clear, and wintry, with a fresh breeze from the northward and eastward, and the water of the bay comparatively smooth.

About 6.20 the officer of the deck noticed that the light on Kanon Saki, which had been a little open on the starboard bow, was now nearly

ahead; in other words, that the vessel was drawing in towards the western shore, due probably to both leeway and tide. He sent at once for the navigator, and meantime, to recover the light on its original bearing, he had the helm put a-starboard and the ship brought up to S.E. by S.

At this juncture a steamer's white light (the "Bombay's") was reported ahead, rounding Kanon Saki, and the officer of the deck saw it soon pass to a bearing on the starboard bow.

The navigator coming on deck, had the ship return to her original course, as a more easterly one would carry her too close to Saratoga Spit. When again heading S. by E. ½ E., both the navigator and officer of the deck saw the "Bombay's" white and green lights bear about a point on the "Oneida's" starboard bow, and both expressed the belief that she would pass to starboard. The vessels continued to approach, the "Bombay" closely watched from the "Oneida." Suddenly, when separated by only a short distance, and the "Bombay" bearing broad on the "Oneida's" starboard bow, the "Bombay" changed her course, and, by the altered position of her lights, it was clear she was heading directly for the "Oneida,"—attempting to cross her bows.

The moment this became certain, the "Oneida's" helm was put hard-a-starboard, with the hope of escaping her. To no avail,—soon she struck; the sharp iron bow of the "Bombay" cut into the "Oneida's" wooden sides at the mizzen rigging, and tore diagonally through the quarter, leaving a gaping wound. While she yet lay across the "Oneida's" stern—close to, but not in contact—the executive-officer hailed in a loud voice, "Steamer ahoy! you have cut us down; remain by us." The steam-whistle was turned on, and some six-pound charges were fired from an 8-inch gun; but notwithstanding these signals of distress, the "Bombay" made no effort to succor her victims. Captain Eyre stopped his engines three minutes and a half, and then steamed up to Yokohama without heading for a moment in the direction of the sinking ship, without ever lowering a boat; nay, worse, with even the malicious boast on his lips that he had "cut the quarter off a Yankee frigate, and it served her right," as he remarked to Lieutenant Clements, R.N., who so testified before the British court.

As the "Oneida's" helm had been carried away, the ship became unmanageable; order and discipline continued, however, and the most judicious measures were taken for the safety of both ship and crew. Hand- and steam-pumps were vigorously worked, and such disposition of sail was made as would beach the vessel on the nearest shoal. But to no use; the rent through which the water poured was too large, and with a rolling motion she rapidly settled by the stern. Soon the waters reached the fires, steam failed, and pumps and engines stopped. The quarter-deck was soon under water; men were clearing away the only two serviceable boats that remained,—the first and third cutters; and

these got clear of the ship as the whole spar-deck became submerged. The captain and officer of the deck stood on the bridge till the water reached their feet, then the latter jumped for his life; the former remained. In an instant the "Oneida" disappeared beneath the waves. The captain, with most of the officers and men, sank to rise no more. Some came to the surface only to struggle a little longer, while a few were rescued by the cutter near by. It has often been asked how, with the land so near, did so many perish. I can only give an answer that satisfies myself.

For some time after the collision every effort was in the direction of saving the *ship;* none thought of self. It was only when their imminent danger broke upon them that they found it too late to devise means of safety; every grating, every ladder, every movable spar that would float a man was then lashed in its place; now out of reach,—submerged! All the boats, save two, were disabled, and these were loaded to their utmost capacity. Furthermore, no land was so near as has been supposed; the nearest was two and a quarter miles distant; surely too far for an exhausted man to swim on that cold night.

To follow the survivors: the first cutter remained near the sunken vessel, picking up those in the water, until the last one visible was rescued. Among these was Lieutenant Yates, who, finding himself the only officer in the party, took charge of it, and directed the men to pull for a little cove near Kanon Saki. The boat, though small for a ship's cutter, had forty-five persons in it,—a shivering crew, whose thin clothes, saturated with water, were now stiffening about them. After much suffering, during a pull of three miles, they landed at a Japanese village, and were hospitably received and cared for.

The third cutter had sixteen persons in it, with Dr. Suddards in charge. It got clear of the ship as she was rapidly settling. Observing a junk passing at a short distance the cutter pulled for it, with the hope of overtaking and bringing it to the wreck, but without success. The cutter then returned to the place the "Oneida" had been, but naught was to be seen save the topgallant-masts just out of water. The boat then headed for shore, and landed near the place the other cutter did, though the people in each boat were unconscious that any but themselves had been saved.

Dr. Suddards walked to Yokohama, eighteen miles, where he arrived the next morning at four o'clock, and went aboard the "Idaho" to report the disaster. The "Idaho," a store-ship, with but few officers and a small crew, was the only one of our squadron in harbor. She had no steam-launch, none of the usual equipments of a man-of-war; her commander was, therefore, powerless to render immediate help to those who might possibly be clinging to fragments of the wreck. In this extremity it became necessary to seek aid from other ships in the harbor.

The "Bombay," with steam still up, lay about half a mile from the "Idaho," and I was sent to request her aid. Did Captain Eyre give it? No! I told him he had sunk a ship with one hundred and sixty men (the number we then believed lost); that many might still be floating on spars and booms, exhausted; that if speedy succor were given they might be saved; that his was the only vessel in harbor with steam up. Would he go down? No! His answer was, "*I think I can clear myself.*"

I then proceeded to the British flag-ship, which lay but a few cables distant, and found there a very different feeling,—hearty sympathy and an earnest desire to do all they could. An officer was dispatched to H. M. S. "Sylvia," with an order to get up steam at once, and another was sent with me to the "Bombay." The evidence of this officer before the court will best describe what occurred. He says, "An officer came from the 'Idaho.' . . . Captain Tinklar (of the 'Ocean') told me to ask him to take me on board the 'Bombay,' and that I was to request the captain of the 'Bombay,' as his was the only ship in harbor with steam up, to go down to where the accident took place and see what he could do. I went on board. . . . I gave him Captain Tinklar's request; he replied, 'I can't; I've got a hole in my bows.' I asked him if that was his answer, and he sent for his chief officer; he asked the chief officer how much water there was in the hold or compartment, and the officer answered about nine feet; the captain then said, 'Do you hear that?' I said 'Yes,' and that I wanted an answer, 'yes or no.' He then said, 'No, I can't.'"

The "Bombay" was partitioned into water-tight compartments, and the place spoken of as having nine feet of water in it was a small one in the very bows: it might have been filled to the ceiling without cause for apprehension. Indeed, here is Captain Eyre's own estimate of the damage on his arrival at Yokohama; it is from the evidence. Lieutenant Clements, R.N.: "I went on board the 'Bombay' on the evening of the 24th. . . . I asked him (Captain Eyre) if he was damaged himself [meaning thereby his ship]. He said that he was, and that the ship was making water, *but nothing very serious.*" In Captain Eyre's own testimony the following occurs: "No injury was sustained beyond the forward compartment. . . . . The next morning" [that is, the one on which I asked him to go to the scene of the disaster] "I steamed down to the scene of the collision and back without having made any repairs," although, as he still further testifies, it was "almost under protest." Yes, he went—at the "request" (?) of his agent, but without rendering any assistance: that was too tardy; it should have been given immediately after colliding, even though, as he states under oath, he was "not aware whether it was customary for two vessels which have come into collision on a dark night to communicate in order to ascertain the amount of injury each has sustained." All

which, I think, point to the defect that prevented extending a helping hand to the "Oneida's" drowning crew as existing in the heart of Captain Eyre, and not in the hull of the "Bombay."

It is gratifying to turn from this unseamanlike conduct to the generous action of the British and Russian naval officers. The former sent the "Sylvia" at once, and no sooner had the latter heard of the disaster than did Captain Mikhayloff, of the "Vsadnik," order launches equipped, ready to proceed on the same mission. The American steamer "Yangtse," Captain Strandberg, also got up steam immediately, so that by 8 A.M. the "Bombay," "Sylvia," and "Yangtse" (the latter having manned boats from the "Vsadnik" and "Idaho" in tow) were all under way for the wreck.

On arrival, no fragments—nothing of the "Oneida" but the top-gallant-masts—were visible. The boats cast off from the "Yangtse" and pulled in for various points of the beach, hoping to find some one that might be washed up. I was in charge of one of the "Idaho's" boats, and seeing the French gunboat "Aspic" coming out from Yokoska, I pulled for her. On going alongside I found aboard the party that had been saved in the first cutter.

Lieutenant Yates sent his men to the "Yangtse," and then went with me to search the beach for bodies. The other boats from the "Idaho" and those from the "Sylvia" and "Vsadnik" were already engaged in the melancholy work. The "Bombay" and "Yangtse" soon returned to Yokohama, and the "Sylvia" remained to tow the boats back. Until late in the afternoon we continued the search, but without finding anything.

By request of the agent of the Peninsular and Oriental Company, a naval court of inquiry was immediately instituted at Yokohama; it was composed of the British consul at Kanagawa, two commanders of the royal navy, and two masters of British merchant vessels in harbor.

All witnesses were examined under oath. A printed copy of their testimony now lies before me, and with it I have refreshed my memory on every point mentioned in this article, although I heard every word of the evidence given and saw every motion of each witness as he spoke,—an obvious advantage in estimating its value. To save repetition, I will state here that every extract I make is from the authenticated British copy of the evidence and minutes of the court.

It may cause surprise to find that the officers and men of the United States navy appeared in a British court: that court was the first organized. An American court, composed solely of naval officers, was subsequently formed; it examined into the circumstances of the collision and entirely exonerated the "Oneida's" officers. But in order to have all the evidence pro and con taken and weighed by the same tribunal, the United States naval authorities yielded a point and allowed their witnesses to go into the British court.

In addition to the lawyer retained for the "Bombay," the British minister to Japan was in constant attendance to watch the proceedings. The United States minister, Mr. De Long, kindly tendered his services to the survivors of the "Oneida." Many of the essential points being of a technical nature, I was requested to assist Mr. De Long, and in this way became familiar with every feature of the case. Both Captain Eyre and another captain of the Peninsular and Oriental Company were always present, in addition to the company's agent (himself a ship-captain), and assisted the counsel for the "Bombay."

Here seems the fittest place to render a just tribute to the memory of Mr. De Long: the earnest, hearty, and efficient manner in which he identified himself with every phase of the "Oneida" disaster should ever be remembered with gratitude by American naval officers; and his ability, zeal, and judgment in conducting the case in court gave it a status that otherwise it scarcely would have had. The court opened at the British consulate, in Yokohama, January 27, and closed February 12, when it rendered a decision.

The witnesses for the "Oneida" were excluded except while giving their evidence, but Captain Eyre was always present.

For some time after the disaster every care was taken to recover whatever bodies the deep might give up; but only that of Captain Williams and four others were ever found; they were accorded a befitting burial,—all nationalities taking part in it, either by naval, military, or civil representatives,—and to-day they lie in a neat little grave-yard at Yokohama, adorned by a commemorative obelisk.

The survivors of the "Oneida" returned to the United States by the next American mail-steamer.

Captain Eyre has long since passed before a Judge who, let us hope, has tempered justice with mercy. I shall therefore introduce only such portions of the testimony regarding the dead as necessarily hinge on the central figure of a melancholy tragedy. His ability, accuracy, and judgment are prime factors in this problem, and to illustrate them I begin with the following extracts:

First. Captain Eyre says that the "Oneida's" speed was "about fourteen knots an hour," the chief officer says "eleven or twelve," and the pilot, "about eight knots:" it was really seven; so that of the three the captain's judgment was the most erroneous.

Second. He says, "The 'Oneida' must have been about one mile from me when I first saw her light;" the second officer says "five or six miles away," and the pilot, "four or five miles." Other parts of the testimony show that all three saw the light about the same instant: the actual distance was then four miles. So that here, too, the captain is farthest from the truth.

Third. He says, "From the time I stopped the engines until I went on again was about ten minutes." The log-book of the "Bom-

bay" being produced in court, the following extract from it was accepted as evidence:

"About.—Stop, 6.15.

"About.—Easy ahead, 6.19; full speed, 6.21."

And the engineer of the ship testifies that "the collision occurred about half a minute after we had stopped." Then the "Bombay" actually *did* wait *three minutes and thirty seconds* to see if the "Oneida" would sink; but this is six minutes and a half shorter than Captain Eyre's recollection of the period.

Fourth. He says, "I imagined the 'Oneida's' quarter-gallery was cut off; it never occurred to me that she was in danger." What! with the "Oneida" as deep in the water as he must have seen she was!

But it was not the gallery alone,—it was the entire quarter, exposing the interior of the cabin, from which a glare of light burst that was seen by various people on the "Bombay."

With regard to this light the second officer says, "I did see a light, or the reflection of a light, from her hull; it was from the after part of her hull, close to her quarter. . . . I could see that her upper works were broken." The carpenter says, "I did see a break made into the 'Oneida' by the 'Bombay.' I think it was a little abaft the mizzen-mast, near her starboard quarter. I saw a light through this hole, which appeared to me to fall on a table. . . . I do not know of any reason to prevent a person standing on the bridge from seeing everything as I did." Captain Eyre was on the bridge. The gunner says, "As she passed" (meaning the "Oneida") "I saw a light through her hull where the break was made; I cannot say how large a piece was broken out; I should think it looked about six to eight feet long, fore and aft; up and down, it may have been six feet. I saw a man apparently leaning up against something through this hole; I saw a light; I saw a portion of a table. Where I was standing was about twenty feet abaft the bridge. I don't know of any reason why a person standing on the bridge could not have seen the same thing as I did." Again I may remark that Captain Eyre was on the bridge.

A passenger of the "Bombay" says, "I could see the quarter near the rudder was cut away; the only thing I caught sight of was what I thought was a table. The hole which I saw was a breach through the vessel's side,—it was through the place that was cut away that the light came."

The table these witnesses saw stood in the captain's cabin, the floor of which was on a level with the water; and as this was lit up by the light they speak of, the peril of the "Oneida" must have been apparent. Is it possible that Captain Eyre alone could have been blind to all this?

Fifth. With regard to the hail "Steamer ahoy!" etc., uttered in such a loud, clear voice by the executive-officer of the "Oneida" that

the second and fourth officers of the "Bombay," the carpenter, two of the quartermasters, and two of the passengers all testified to having heard it, Captain Eyre alone was deaf to the appeal. In fact, all his senses seem to have been unusually obtuse at this juncture. But he was not left uninformed of the hail; here is the second officer's evidence on this point: "I did not report the hail, but the fourth officer did. The report was made immediately. I ordered the report to be made; I saw the fourth officer go to the bridge where the captain was. I think I heard the steam-whistle of the 'Oneida' going after the collision: it was after the hail that I heard the whistle." And the fourth officer testifies that "immediately afterwards, as the ship ('Oneida') dropped astern, she hailed us. . . . I went to the bridge and reported to the captain what had occurred. The commander asked the pilot if there was any safe place where the other ship could go ashore; the pilot said yes; she was close to the Spit." From which it may justly be inferred that Captain Eyre feared the "Oneida" *was* in *real* danger, notwithstanding his evidence to the contrary, for he well knew that vessels are not beached for trifles.

Sixth. Shortly after the collision the "Oneida" began firing guns of distress, and continued them until she sank.

As she remained afloat but fifteen minutes, it is safe to say that some of these guns were fired, at latest, twelve minutes from the time of the accident; the "Bombay" waited three and one-half minutes before going ahead, which reduces the time that the two ships were rapidly separating to eight and a half minutes. At the rate the "Bombay" was steaming and the "Oneida" drifting, the two vessels could not have been more than *two* miles apart at the end of eight and a half minutes.

Now, the report of a six-pound charge fired from an 8-inch gun is quite loud and its flash quite bright; but neither Captain Eyre nor any one else on the "Bombay," at the distance of two miles, on a comparatively still night, heard the one nor saw the other; yet, at Yokohama, *ten miles distant, and eight miles more to windward of the "Oneida" than was the "Bombay," the guns were distinctly heard.* I can only ask, Can these things be?

Curiously enough, this is one of the two "material points" (see decision of the court) on which all aboard the "Bombay" are in perfect accord with their captain: the other point I will mention presently.

In regard to the guns having been heard, I will make the following extract from the official minutes of the court:

Mr. De Long here states, "I offer to prove by Mr. Shepherd, consul at Yedo, Mr. Farrington, and my own oath that at about the time the 'Oneida' is said to have sunk I was sitting in my library in company with my wife; we all heard and counted three cannon-shots following each other; and at the same time we spoke of it to each other, wondering what it could mean. Further evidence of General Lyon and other

residents as to their having heard them is also offered." But, "the court decided that no further evidence on this point was required."

Seventh. The second "material point" on which the witnesses for the "Bombay" agree with their captain is the bearing of the "Oneida"; according to every one of them she was just *one half point* on the *port* bow, notwithstanding that they stood on different parts of the "Bombay's" deck, when, of course, to be strictly correct, the bearing of a near object should be different to each observer.

Eighth. The "Oneida" carried a spare topsail yard, *a b* (see Fig. 1), lashed outside the starboard quarter, about three feet from the water;

FIG. 1.

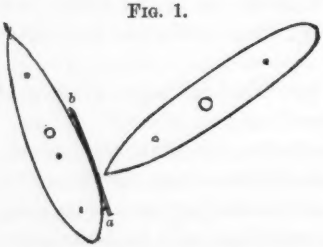
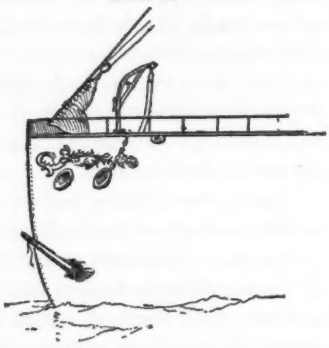


FIG. 2.

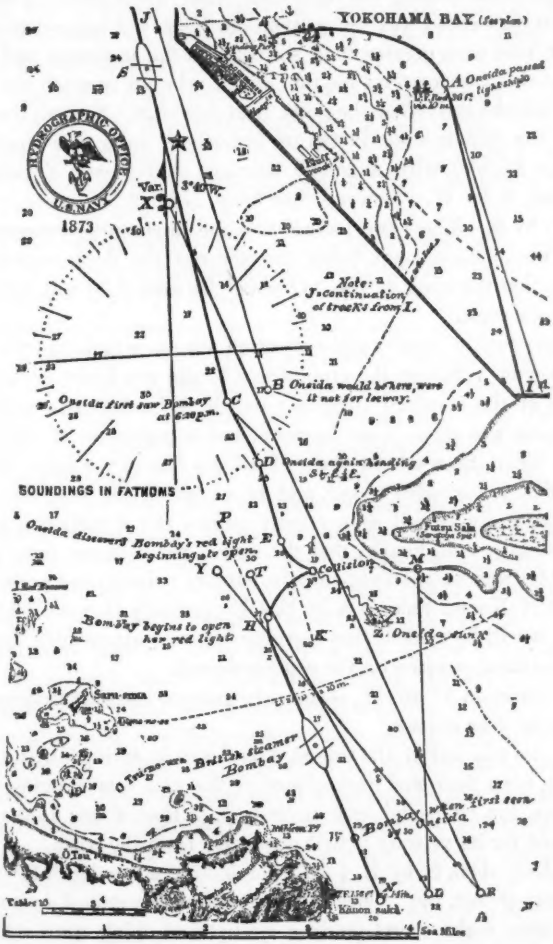


the "Bombay" cut this in two, between the lashings, and meeting resistance at the *a* end, it penetrated the iron of the port bow, as in Fig. 2, and bulged out and fractured the starboard bow. In regard to this matter Captain Eyre testifies as follows: "The 'Bombay' is built of iron; the thickness of the plates is about one-quarter of an inch now (!); they were originally five-eighths of an inch. I found a spar sticking in through both sides of the 'Bombay'; the spar is about seven and one-half to eight inches in diameter. . . . The spar sticking through my bows went through two thicknesses of iron, and not through any wood. The distance between the sides of the bow at the point where the spar entered is about three or four feet, I should think. I thought the spar must have been a spar from the quarter of the 'Oneida.' . . . *It was almost immediately after the collision that we discovered the spar.* . . . The 'Oneida's' gaff and spanker-boom and part of her sail were left hanging on my bow. . . . It did not strike me that I must have penetrated pretty far into the other vessel in order to take her boom. . . . I think it possible that a spar from a vessel could penetrate and remain in the bows of another vessel without the hull of the former vessel receiving an injury."

All this from a sailor of thirty-seven years' standing, twenty of them in command of both sailing- and steam-ships. Such was the man

that commanded the "Bombay,"—a man whose professional errors, however gross, can be regarded with charity, but whose want of heart, whereby he left one hundred and fifteen brother seamen to perish in the dangerous element they make their common home, can never be regarded but with loathing.

I shall now proceed to describe the tracks of the ships which are laid down on the accompanying chart. (In order to bring this chart within


YOKOHAMA BAY
HYDROGRAPHIC OFFICE U.S.NAVY
1873
Var. 3°45'W.
SOUNDINGS IN FATHOMS
Oneida first saw Bombay at 6.20 p.m.
Oneida would be here, were it not for leeway.
Oneida again sighting Sagami.
Oneida discovers Bombay's red light beginning to open.
Bombay begins to open her red light
Collision
British steamer Bombay
Sea Miles

the limits of the page, the top part had to be cut off and inserted in the upper right hand corner. The junction of the line A I with the line J C is at J; both these form one straight line, as do also the two parts of the line A *a* and *b* B.)

To lay down the "Oneida's" track I have two well-determined points: First, the point A, where, at 5.30 P.M., she passed the light-ship at the distance of three cables. Although this time is not specifically given in Lieutenant Yates's evidence, still it is easily deduced from what he does say. The hour the ship began steaming ahead from her anchorage was noted,—5.15 P.M.; the distance from the anchorage to the light-ship is one mile and a half; she steamed slowly at first; sail was not set until after passing the light-ship; then, when under all sail and easy steam, her speed was seven knots an hour, per log,—certainly it could not have been greater than six between the anchorage and light-ship. At this rate it would require fifteen minutes to reach the light-ship, so that she arrived at the point A at 5.30 P.M. Second, the point Z, where the ship is sunk in twenty fathoms of water (her topgallant-masts just visible), with magnetic bearings as follows: Kanon Saki light-house, S. by W.; Saratoga Spit buoy, N.W. ¾ N.; centre of Saru Sima, W. by S. These two points with the intervening courses, from the evidence of Lieutenant Yates, the officer of the deck, establish beyond question the track of the "Oneida" between 5.30 and 6.45 P.M., the hour she sank.

At the court of inquiry some objection was made to the courses given by Lieutenant Yates, on the ground that he did not know *precisely* the deviation of the standard compass; but, if it be borne in mind that this compass was elevated on the poop, and at a distance of eighty feet or more from the resultant force of all the iron in the ship; that the "Oneida" was a wooden vessel, and hence caused but little deviation; that on southerly as well as northerly courses the deviation is least,—often nothing; and, finally, that the course per compass from a point three cables west of the light-ship to another point three-quarters of a mile east of Kanon Saki is S. by E. ¼ E. (precisely that the "Oneida" headed), it will be evident that there could be no appreciable deviation of her standard compass on the courses steered.

The variation 3° 40′ W. is the only compass correction necessary to render them *true* courses.

The rise and fall of the tide at Yokohama is, spring six and a one-half feet, neap four and three-fourths; the ebb was running a short time when the "Oneida" got under way, so that if one knot an hour be allowed for its velocity it will not be far from the truth.

Heading, then, S. by E. ¼ E. from 5.30 P.M., under full sail and light steam-power, the "Oneida" proceeded at the rate of seven knots, and at most eight knots (adding strength of tide), until 6.20 P.M. During these fifty minutes she went seven miles, which would have brought her to the point B; but from leeway—being on the port tack, wind northeast, force about 4—she had gradually fallen off towards the western shore, until, at 6.20, she was really at C. This fact became apparent to the officer of the deck by the altered bearing of Ka-

non Saki light. That she could not have fallen off farther than C will be evident if we consider that the light would then bear on the "Oneida's" *port* bow, which it did not, but a very little on the starboard bow, when Lieutenant Yates observed the effect of the leeway. At the point C the helm was put a-starboard to recover the light on its original bearing. It was at this juncture that the officer of the deck called the navigator's attention to the "Bombay," which had been sighted a few moments previously, and that both officers said she would pass well on the starboard side, as she was then showing only her green and white lights.

The "Oneida's" helm had been kept a little a-starboard about five minutes, and the ship had come up as high as S.E. by S. The mean between this and her original course gives S.S.E. ½ E. as a bearing, and 0.6 of a mile as the distance, to establish the next position of the "Oneida,"—the point D.

From this she continued S. by E. ½ E. until reaching the point E, where her helm was put hard a-starboard to avoid the "Bombay," suddenly discovered opening her red light at H. Just before reaching H the "Bombay" bore broad on the "Oneida's" starboard bow, with her green and white lights visible; in this case the international rule of the road is for both vessels to put their helms a-starboard to give each other a wide berth; but the "Bombay" was violating this rule, her helm being a-port, as the opening of her red light clearly indicated. Besides conforming to the rule of the road, that putting the "Oneida's" helm a-starboard was the most feasible means of escaping the "Bombay" seems reasonable, if we consider that the combined speed of both vessels was over sixteen knots an hour,—that the distance apart was about three-quarters of a mile,—and that therefore they must have met within *three minutes*. Had the "Oneida's" helm been put a-port at the point E, it would have required some seconds to do so, and a few seconds more for her to feel it, besides which all the after-sail would impede her ready motion to starboard. True, this sail might have been handed, but to man brails and clew-lines requires *time*; at the crisis under consideration this was limited to *three minutes* in which to do everything, so that with the "Oneida's" helm a-port it is most probable that the two ships would have met bows-on; at best it would have been the case of one vessel crossing another's bows close abroad, which is the one of the greatest danger.

Hence the manœuvre of the "Oneida" conformed to the rule of the road, was the least perilous, and the most likely to avoid the "Bombay"; and it is evident that the greatest speed she could attain at this moment—rather than to stop and reverse her engines—would be the best, for *twenty feet more*, as Captain Eyre testifies, and both vessels would have gone clear of each other without injury. Just previous to collision the "Bombay's" helm was put hard a-starboard, to swing the

ships parallel to each other, whereby she struck the "Oneida's" mizzen rigging at an acute angle, instead of cutting the ship in two at the mainmast, as she otherwise would have done.

The "Bombay" cut the "Oneida's" starboard quarter entirely off; the rudder and wheel were carried away; she flew up into the wind; the stern rapidly submerged; sail was shortened; some that remained set caught a-back,—and from all these impediments to headway, besides the shock of collision, it is impossible that she could have drifted a greater distance than from F to Z—nearly a mile—in the fifteen minutes she remained afloat after collision. The ship is sunk at Z, so that beyond a doubt the collision took place at F. Thus is the track of the "Oneida" established with almost absolute certainty.

Now, to locate the "Bombay" I have a variety of tracks; so conflicting is the testimony on this point that no two witnesses agree within any reasonable limits of error. Indeed, I regard their evidence on this point as mere guesses. How could it well be otherwise with the night so dark that all bearings and distances had to be very roughly estimated? However, I will lay down the track of the "Bombay" according to two witnesses, and then plot the one she undoubtedly took,—the course that every steamer entering Yedo Bay follows.

I will first take the statement of the captain, as, being charged with the responsibility of the ship, he ought best know her position.

He says, "When Kanon Saki light-house was abeam of my ship I should think it must have been about a mile distant, as nearly as I can guess. . . . We altered the ship's course to north when the light was abeam, I think. That course would carry me clear of Saratoga Spit."

Plotting this, I have the point L abeam of Kanon Saki, and one mile from it; a north course at the rate the "Bombay" was going would run her aground in *twenty minutes* at M!

Only by passing Kanon Saki, not at the distance of a mile, but of one-twelfth of a mile (about two hundred yards,—rather bold navigation, one would say), could Captain Eyre clear Saratoga Spit on a north course; even then he would have to pass to the eastward of the buoy and just graze the shoal. Evidently he had not examined the chart of the harbor he was entering for the first time, for he states, "I have never been in Japan before."

For the next position of the "Bombay" he says, "At 6.15 P.M. on the 24th inst. the light-house on Kanon Saki was bearing S. by E.; the Spit was bearing E. by N. as near as I could judge." Hence the "Bombay" was at T. At this point he says, "I saw a light (the 'Oneida's') half a point on the port bow,—a bright light. Shortly afterwards I made out two lights,—side lights,—a green and a red light. . . . When I saw the light my course was due north." These statements cannot be reconciled with those regarding the first position. The "Bombay," he says, headed due north from L; she

ought then be at M after the lapse of twenty minutes; but he says she was at T. What agency can he assign for getting her there,—leeway? A screw-steamer with no sail set, running eight knots an hour, to be drifted nearly two miles in a run of three,—make three points leeway? Impossible! Furthermore, he says that at T "saw the 'Oneida' one-half point on *port* bow and about a mile off." The "Oneida" was then at D, but a vessel at D is on the *starboard bow* of one at T; so that altogether the captain's statements are not only confused and contradictory, but they exhibit ignorance inexcusable of the relative position of his ship and that of a dangerous shoal.

The only way to account for the point T, near which the "Bombay" must certainly have been at some time, and not aground at M, is to suppose that she passed Kanon Saki nearer, say at N. Indeed, Captain Eyre stated that the position of L was only a conjecture; and the chief officer testified that they passed Kanon Saki at the distance of half a mile,—a much better guess.

A mail-steamer, to which time is an important item, will take the shortest good route; and as the "Bombay" could pass Kanon Saki with the greatest safety at N,—this being half a mile from the beach with twenty fathoms depth of water,—she did undoubtedly do so.

I will now plot the "Bombay's" track according to another witness; and as Captain Eyre testifies that "when a pilot is on board it is left to him to steer the courses," I will select the positions from the pilot's testimony. He says, "When the Kanon Saki light was abeam we were about a mile and a half distant from it; we were heading N.N.W. by the compass."

Observe that Captain Eyre said a *mile* distant, and a course *due north*, for the same time.

Plotting the pilot's first position, I have it at R, with a N.N.W. course projected from it; and he says, "I continued on that course until the light bore S. by E."

Drawing a line S. by E. through Kanon Saki light-house, its extension will cut a N.N.W. course from R at the point X,—half-way up to Yokohama. This, the pilot says, is the position of the "Bombay," heading N.N.W., when the light-house bore S. by E.; but a vessel thus situated at X is on the *starboard* bow of one at S. heading S. by E. ¼ E. (the case of the "Oneida"), even though the pilot does swear that at this juncture the "Oneida" bore half a point on the *port* bow of the "Bombay."

Thus I have demonstrated that, by both the captain's and pilot's sworn positions, the "Bombay," at T according to the one, and at X according to the other, was on the *starboard* bow of the "Oneida" when the latter was at the respective positions of D and S. Always on the starboard bow, in perfect accord with the evidence of the "Oneida's" witnesses, showing the green and white lights only, in which case the

invariable rule of the road is for both vessels to starboard their helms, which the "Oneida" *did* do, and which the "Bombay" did *not* do.

But the "Bombay" was manifestly not at X, for the pilot again says, "When we first sighted the 'Oneida' the Kanon Saki light bore about S. by E. or S.S.E. At this time the Saratoga Spit buoy bore from us E. by N." Plotting these bearings I have Y for the position of the "Bombay" at the same instant that the captain says she was at T. If the ship had headed N.N.W. the entire time from leaving R she would have run on the buoy. The pilot says, however, that on bringing Kanon Saki light to bear S. by E. he changed course from N.N.W. to N. ½ W. I have already proved that on a N.N.W. course from R he could bring Kanon Saki light to bear S. by E. *only at the point X*, where we see the "Bombay" was *not;* but at Y, according to bearings when abreast the buoy; and changing the course to N. ½ W. would take the "Bombay" nearer Saratoga Spit, rather than towards the point Y; from all which only one conclusion can be drawn,—*that the "Bombay" did not pass Kanon Saki either at L or R, but at some nearer point, as N;* then steering a N.N.W. course from the point N, both the captain's and pilot's statements become more easily reconciled.

The point Y, however, equally with T, is too far to the northward for the position from which the "Oneida" is first seen.

We have now two highly probable points with which to establish the *real* track of the "Bombay": N, where she passes Kanon Saki, and another point midway between Y and T. Drawing, then, a line through these two points, we can follow the "Bombay" until her helm is put a-port at H, and she collides with the "Oneida" at F.

With the tracks of both ships thus before us, it is most lamentable that the "Bombay" did not continue her straight course to the point P, then the "Oneida" would have proceeded equally direct to K, and both vessels would have passed to starboard of each other *at the distance of nearly half a mile without either having to touch her helm!*

The courses steered by the "Bombay," and the bearings and distances of surrounding objects, may surely be considered "material points." I have just shown how Captain Eyre and his pilot disagree about these matters; and by way of contrast I will cite in this connection a sentence from the decision of the court: "The statement of Mr. Eyre is borne out in all its *material points* by the evidence of the pilot and chief officer, who were on the bridge with him, and also by that of all the officers of the 'Bombay,' who are able to testify to the circumstances." Hardly, I should say.

In view of the preceding I will introduce here an extract from a letter of the Secretary of the Navy, in March, 1870, to the Speaker of the House of Representatives, in answer to a resolution of the House calling for information regarding the circumstances of the collision. He says, "From an examination of the evidence in the pos-

session of the Department, the testimony taken before a court of inquiry composed of British officers, the evidence of Master (now Lieutenant) Yates, the officer of the deck on board the 'Oneida' at the time of the collision, the accompanying charts, and the analysis of Lieutenant Lyons, it is the opinion of the Department that the 'Oneida' was, when she was struck, steering her proper course out to sea from the Bay of Yedo, bound to the United States; that the ship was well commanded and her discipline good, and that all the necessary precautions were taken by her commander to insure the safe navigation of the vessel, and to prevent collision; and the rules of the road conformed to agreeably to the regulations of the United States Navy; and that no blame is to be attached to the officers or crew of the 'Oneida' for the collision."

The curious may wonder what was the result of the court of inquiry at Yokohama.

After giving a summary of the points it considers proven and those not proven, it exonerates Captain Eyre from any blame whatever for the collision, and then closes its decision with these words: "We recognize the fact that he (Captain Eyre) was placed in a position of great difficulty and doubt, and in circumstances under which he was called upon to decide promptly; but we regret to have to record it as our opinion that he acted hastily and ill-advisedly, in that, instead of waiting and endeavoring to render assistance to the 'Oneida,' he, without having reason to believe that his own vessel was in a perilous position, proceeded on his voyage. This conduct constitutes, in our opinion, a breach of the 33d section of the 63d chapter of the Merchant Shipping Act, Amendment Act of 1862, and we therefore feel called upon to suspend Mr. Eyre's certificate for six calendar months from this date."

One hundred and fifteen lives lost—six months' suspension! Of what? Of a piece of parchment, which, after the lapse of six calendar months, warranted his going again upon the high seas in command of a ship.

The "Oneida" lies sunk close to Saratoga Spit, and in order to have the collision occur where it did the "Bombay" must have gone far out of her way to crowd the "Oneida" upon a dangerous shoal,—with what object? *To get on the right-hand side of the channel!* as the testimony shows in these words: "In coming up a narrow channel it is usual to keep on the starboard side of such channel."

Yes, there seems to be some *local* English custom that in navigating narrow inland waters vessels must keep to the *right;* and in order to conform to a regulation that may work very well on the Thames, an imperative international rule of the road was violated in a broad bay, miles in width.

The pilot says he thought the "Oneida" "was a Japanese by the way she acted." Every one who cruised in Eastern waters in those

days is well aware of the lamentable want of consideration of all foreigners for native craft; and this fact may be of use in explaining why the "Bombay's" helm was persistently kept a-port even when only the "Oneida's" green and mast-head lights were seen over a mile off, as the pilot testifies.

In all trials in which interested witnesses are allowed to testify there is a vagueness,—a want of accurate recollection about such events as may injure themselves. Man is loath to criminate himself, and the law does not require it. The inquiry into the "Oneida" disaster brought out no phase of human character different from the general average, and much of the irreconcilable testimony in the case may be accounted for by the following extracts, recorded in the minutes of the court previous to any evidence whatever being taken:

"Am I to understand that any evidence that I or any other person may give here on this inquiry may hereafter be used in any proceedings against me? (Signed) A. W. Eyre." "Mr. Eyre was then told that any evidence now given might be taken as evidence against him in any future proceedings. . . . Mr. De Long, the United States minister, asked to be allowed to say a few words to the court before Mr. Eyre's request was replied to." And the nature of Mr. De Long's remarks, though not recorded in the minutes of the court, was, "that if the evidence warranted it, Captain Eyre would be prosecuted for the greatest crime known to the law,—murder."

Two days later the court, through its president, the British consul at Kanagawa, made the following specific statement on this point: "This is a court of inquiry held on the application of Mr. Dalziel, as being in the interest of the owners of the steamship 'Bombay.' It is not what is commonly called a court of law, nor is Mr. Eyre upon his trial.

"Let my reply to Mr. Eyre at the commencement of the proceedings be well understood. I did not mean to tell him that this was a preliminary examination upon a charge laid against him. No charge has been made. Should a charge be preferred against him before me, a proper examination will be held into such charge; and if in my opinion there is sufficient evidence upon which to commit him to take his trial, he will be committed accordingly; otherwise the charge will be dismissed. . . . In order that it may be understood to what extent these proceedings may be put in evidence in a court of law, I will explain: Supposing that a witness answers a question before a court of law in a certain way which appears unsatisfactory to his interrogators, he may be asked, 'Did you not, on such and such a day, during the holding of a naval court of inquiry, say so and so?' And then if the witness should deny that he said it, a certified copy of these minutes may be tendered as evidence that he did. Mr. Eyre might also be asked, 'Was the result of a naval court of inquiry so and so?' And in this

case also a certified copy of the proceedings may be tendered as proof of such result." All of which put Captain Eyre and every other witness for the "Bombay" well on his guard from the outset.

Although Captain Eyre, by an error of judgment, left a temporary stain on the name of a British sailor, still it should never be forgotten that it was British sailors who nobly came forward in our moment of extreme necessity and rendered hearty and efficient aid; British sailors who gave us a ship and boats to search for the "Oneida's" drowned; British sailors who enabled us to render befitting obsequies to the dead; and British royal marines who fired the requiem volleys over the captain of the "Oneida's" grave.

T. A. Lyons,
Lieutenant-Commander U.S.N.

THE ORGANIZATION AND EMPLOYMENT OF THE GERMAN ARTILLERY (CONCLUDED).

Mobilization.

IT is difficult to describe this subject, even in general terms, without first discussing the method of recruiting, the details of which are too extensive for repetition here. It will perhaps be sufficient to say that for purposes of instruction and discipline about one hundred and fifty thousand men enter the German army yearly, and that the parochial registers of births form the basis of calculation of this contingent.

Annually, on the 15th of January, a list of births of the past year is sent to the Ersatz commissioners. From this an alphabetical list is prepared of the young men liable to service as they come of age. As families and individuals frequently change their domicile, it is made the duty of every male citizen to report to the Ersatz authorities of the recruiting district in which he resides, with a view to having his name placed on the register.

The towns, villages, and parishes are arranged alphabetically, as well as the male population of each. Every year the emperor fixes the number of the annual contingent, and this is divided among the states of the empire according to population, and finally among the cities, towns, etc. The number to be furnished in any one recruiting district being made known, the young men liable to service draw lots among themselves to determine who goes first. In this way conscripts who draw high numbers have a chance of not being called for service in time of peace, so long as the number of those available is in excess of the number required to fill vacancies. Those who neglect to register are not allowed to draw, and are the first to be called on for service. Volunteers for one or three years, and those physically unfit, are not required to draw; and those morally unworthy to be soldiers are not allowed to draw. In every army corps district certain officials are charged with the supervision of recruiting. They are called "Ersatz" authorities. Each landwehr recruiting district has an Ersatz commission, consisting of the district commander and one civil officer.

Each brigade district has a superior Ersatz commission, consisting of the infantry brigade commander and two civil officers.

In each army corps district the highest recruiting authorities are

the corps commander, and one civil officer; finally, for the whole of Prussia, the war minister, and the higher civil functionaries. It is the duty of the Ersatz authorities to look after the register, and to call out the annual contingents for service and determine in the first instance every question concerning liability to service. The right of appeal lies from the decision of the lower commissioners to those higher, and eventually to the war ministry. The course of business is briefly as follows: The Ersatz commission of each landwehr recruiting district (of which there are seventeen to each army corps district) meets in the early part of the year, and every man liable to service as shown by the registers must present himself to the commission, which decides whether he is to be called out at once or put back for service at some future day. Although no one is exempt from service (except members of the royal family, of the medialized houses of those excepted by convention or special right, and in time of peace the sole supporters of families, or those incapable of work, etc.), entry into service may be delayed in time of peace for various causes, and it is the duty of the Ersatz commission to determine when this privilege should be granted. The superior Ersatz commission meets later in the year, and before it appear all the conscripts not put back by the landwehr district commission. The recruits are again medically examined, their civil status investigated, and the requisite number named for service. The latter go on furlough until October 1, when they join their regiments. The army then is for the most part composed of conscripts, with a few one and three years' volunteers. Not more than four per company of one-year, or forty per battalion of three-year volunteers are allowed. The volunteers pass into the reserve at the expiration of their service, and from the one-year volunteers discharged with the necessary certificate of qualification are appointed a large number of officers and non-commissioned officers of reserve and landwehr. The only distinction I have been able to find between three years' volunteers and conscripts is that the former are permitted to choose their regiments and arm of service, whereas the latter are not. The men of the reserve are liable to be called on each year, and to take part in two manœuvres of not more than eight weeks each. After seven years' service with the active army, the soldier passes into the landwehr for five years, and may be called on twice during this period for from eight to fourteen days' exercise. Soldiers of the reserve and landwehr are considered on furlough, and so that they obey the orders they receive are in the full enjoyment of all their civil rights; if abroad when mobilization takes place, they must return to their homes at once, unless they have been expressly exempted; similarly those liable to service who wish to live abroad must obtain the necessary authority.

About thirty recruits are required annually for each battery, and one hundred and sixty-five for each battalion of artillery.

Supply of Horses.

Whereas about ninety-seven thousand horses are sufficient in time of peace, three hundred and twenty-one thousand are required to place the German army on a war footing. In procuring them the same system is observed as in recruiting the men. The horses of each district are registered and classified as riding-, draught-, or pack-horses, and when war is declared every citizen owning horses is obliged to bring them before a purchasing committee, which either buys or rejects them. With this brief description of the German method of recruiting perhaps the subject of mobilization will be better understood.

Mobilization, as we well know, means the change from a peace to a war footing. The German army is mobilized by army corps, and the secret of the celerity and certainty with which this is done lies in the peace preparations which comprehend an almost exact arrangement of the smallest details; for their execution the Germans have devised the most perfect system of decentralization ever known. Everything to be done, and the civil and military officials who are to do it, from the emperor to the last man, is determined on beforehand, so the emperor has simply to issue his decree and the energies of every official are directed to the one important object of putting the army on a war footing, and moving it to the threatened frontier, *according to a plan already adopted.*

The German staff have discussed every probable emergency likely to arise from the political and geographical situation of the empire, so that whether the war be offensive or defensive, and the theatre of operations embraces one frontier or several, the army is mobilized and concentrated without the confusion and delay caused by unforeseen emergencies or half-matured plans. The scope of this paper will not admit of a full account of the plan of mobilization; a general allusion to it, with the duties affecting the artillery, is all that will be attempted.

As previously observed, the empire is divided into as many geographical districts as there are army corps, the Guard corps excepted. Each corps district is divided into two division districts, each of the latter into two brigade districts, each brigade district into from two to six landwehr battalion districts, and each battalion district into from two to six company districts. The corps, division, and brigade districts are under their respective staffs; each landwehr battalion district has its commander, and its company district has a district sergeant-major, who is the channel of communication between the battalion district staff and the men on furlough. Each company district is under the jurisdiction of a provincial civil board called a landrath circle. The military officers above mentioned are called the territorial authorities, and in time of peace all men on furlough, or of the reserve and landwehr, are under their jurisdiction, and they are responsible for their

instruction, administration, etc., as well as for the mobilization of their respective recruits.

When the army corps is mobilized, the army corps, brigade, and battalion staffs are replaced by corresponding representative staffs, who assume all of their functions, leaving the former free to give their entire attention to the troops ordered to the field.

The order for mobilization is given by the emperor, and immediately communicated by the war ministry to the headquarters staff, the chief administrative authorities, and the commanders of army corps. Within twenty-four hours the corps commanders must communicate the orders to the troops under their command, observing the following sequence:

1. The commanders of landwehr battalion districts.
2. The commanders of divisions.
3. The brigade staff of the artillery, staffs of brigades, and regiments of infantry and cavalry.
4. The staff of the rifle battalion.
5. The engineers.
6. The train battalion.
7. The intendance.
8. The commandant of headquarters.
9. The artillery depot, the chief presidents, the directors of posts, and the landrath authorities.

On the receipt of the order for mobilization the commander of each landwehr battalion district prepares and sends to the landrath authorities the "calling-out orders"; the landrath authorities notify the men; the latter are allowed twenty-four hours in which to attend to their private affairs, and then they report, walking to their destination if near, or if more than twelve miles, transportation is furnished by the bürgomaster, who afterwards settles with the intendance department.

Although special rendezvous may be appointed in order to facilitate mobilization and prevent crowding, as a rule each regiment, battalion, etc., is mobilized at its headquarters. As far as possible all men discharged from the different arms of service return to them again when mobilization takes place, thus each has its reserve of well-trained men. As for the officers and non-commissioned officers, they are already assigned in time of peace, and know their companies, regiments, etc. None but experienced officers, who are either discharged from service or are on furlough, etc., are named to command reserve, depot, or landwehr batteries, companies, etc. Such, in brief, is an outline of the general plan of mobilization. In the artillery, the orders for mobilization are communicated to the various artillery inspectors, and to the commanders of artillery brigades, who at once put them into execution, as follows:

1. By calling a sufficient number of the reserve to fill up all the

regular batteries, companies, etc., and for the mobilization of the division ammunition columns.

2. The formation of all depot and reserve batteries and companies as heretofore explained.

3. The formation of the reserve parks and trains.

Sufficient war material to place the batteries on a war footing is always under the control of the battery and company commanders, and in every regiment the material necessary for the division ammunition columns is under the supervision of five captains, the remainder is kept in the artillery depot near at hand. Cavalry officers may be placed in charge of the small-arms munition columns when the number of artillery officers is not sufficient.

In procuring the necessary horses, the rule in Germany is as follows:

Each regiment receives its horses from the district which provides it with recruits. At the time of mobilization all the horses of a district are assembled, and received by either artillery or cavalry officers, assisted by a veterinary surgeon, clerks, etc. The horses thus chosen are approved by a valuing commission, who pay the stipulated price, and the horses are properly shod, provided with an extra set of shoes, halters, bridles, two picket-ropes, and are at once turned over to the regimental escort parties. In distributing the horses, the field troops are first provided, and then those of the reserve and landwehr, the battery commanders selecting according to their fitness the wheel, middle, and lead teams and riding-horses. Simultaneously with calling in the men on furlough, and those of the reserve and landwehr, the cadres of the ammunition columns, reserve, and landwehr batteries are formed, each battery of the field artillery giving up a number already designated of non-commissioned officers and privates, who serve as nuclei for the new formations; thus each mounted battery of field artillery gives five sergeants, three lance corporals, eight cannoneers, for the division ammunition column; two sergeants, one lance corporal, three cannoneers, for the two depot batteries. Four of the mounted batteries of every regiment furnish two non-commissioned officers, and the other four each one non-commissioned officer for the two reserve batteries. In the same manner each company of the foot artillery gives up a nucleus for the formation of a corresponding company of landwehr.

The officers are in part taken from the active army, and partly from the reserve and landwehr. The instruction of the necessary drivers and cannoneers commences at once, and not later than three days after the arrival of the horses all the batteries and division ammunition column of the field artillery make a practice march to test harness, etc.

The representative authority of the field artillery regiments, whose departure is appointed, is the staff of the depot division of the regiment, under which is also the division of tradesmen; but both are subordinate to the staff of the foot artillery regiments, which, as has been

heretofore explained, is in charge of all the artillery not sent to the field. After the departure of the field artillery brigades from the army corps districts, the commanders of the foot artillery regiments act as representative authority for all the artillery of the districts, and in this capacity the depot divisions of the field artillery regiments, the reserve batteries, and tradesmen divisions are under their authority.

The following table shows the number of depot and reserve batteries and companies formed, and the officers, men, and horses required to place the Prussian field and foot artillery on a war footing:

Designation.	Field-Officers.	Captains.	Lieutenants.	Medical Officers.	Enlisted Men.	Horses.	Depot Batteries.		Reserve Batteries and Companies.	Ammunition Columns.	Tradesmen Division.
							Mounted.	Horse.			
Field artillery.....	19	295	765	28	63,300	52,610	43	13	42	28	28
Foot artillery.....	38	120	458	66	25,350	.....	...	...	44	...	...
Total.....	57	415	1223	94	88,650	52,610	43	13	86	28	28

Tactics.[1]

The main feature of the German artillery tactics is their simplicity: every unnecessary formation and manœuvre has been avoided. Among the recent changes in this direction is the suppression of the school of the section, which now forms part of the school of the battery as in our tactics.

The tactics are arranged in all essential respects like ours, and include foot and mounted instruction.

1*st. School of the Piece.*

The gun detachment consists of one chief of piece and six cannoneers successively numbered.

No. 1 fires. No. 2 manœuvres the breech fermature. No. 3 sponges and gives lateral direction to gun (the steel-bronze guns of the Austrians require no sponging). No. 4 carries ammunition and loads. No. 5 opens the chest and assists No. 4. No. 6 belongs to the reserve and is not in the gun detachment in time of peace, except at grand parades. There are, therefore, three men actually at the gun and two engaged in carrying ammunition, while the chief of piece superintends all.

[1] In preparing this article I have drawn from the written notes and memoranda of Major-General Walker, R.A., English military attaché at Berlin, who accompanied the crown prince during the last two German wars, and from an article in the *Revue d'Artillerie*, prepared by Captain Lippman, of the French artillery.

The various movements of the piece unlimbered are similar to those set forth in our tactics. In limbering, the limber and piece are made to approach each other; and when unlimbered, the pole or the heads of the horses of the limber are turned from the piece to the rear, which, when the horses are in, greatly facilitates limbering.

The posts of the cannoneers, piece limbered, are as follows: 1 and 2, opposite the axle of piece; 3 and 4, the middle of the stock; 5 and 6, opposite the limber-axle. When mounted on the boxes, 1 and 2 are on the axle-seats; 3, 4, 5, on the limber-chest of piece.

The cannoneers on the axle-seats work the breaks when the piece is in motion by means of the handles, which are conveniently adjusted between their legs when seated. In the school of the piece horsed, the drivers are instructed in tandem-driving, and for this purpose reins are carried in the limber-chest. With a six-horse team, if the lead driver is killed the middle driver takes his place, and if both are killed the driver of the wheel team drives the middle team tandem, the lead team being removed.

This only takes place when the resources of the battery are so reduced as to make it imperative.

In both the mounted and horse batteries each piece is conducted by a sergeant (chief of piece), who rides just in front of and opposite the centre of the lead team. In manœuvring the driver has simply to follow the chief of piece. Each of the caissons battery-wagons are similarly conducted by a leader (Vormeister),—an arrangement which greatly facilitates the drill.

School of the Battery.

On foot the battery is formed in two ranks and divided into two platoons, and when the drivers are present they are united to form a third platoon. Each platoon is divided into gun detachments of three files in the mounted and four files in the horse batteries. The principal foot movements are the formation in line and march to front, thence by a flank, formation of column of platoons or detachments from line and the reverse, changes of direction. In most respects the evolutions are so like our own as not to require comment. The interval between the guns is twenty paces. It is to be observed that the caissons are not used at drill, and that the captain regulates the rapidity of fire by the command "Fire slowly," after which each piece is fired at the command of the chief of section or an order from the captain, or "Fire rapidly," when the guns are fired with the greatest rapidity; to resume the fire at the usual rate, the captain commands "Ordinary firing."

In the horse batteries the cannoneers are taught to execute the charge and other cavalry manœuvres, so that, in case of necessity, they may be used to protect the battery when without support. They are

formed in two ranks by the union of the platoons without intervals, and the charge is executed in line or as foragers, after which they rally on their pieces.

School of the Battery Division.

Three or four batteries united form a battery division; if the drivers take part in the foot drill, they are united to form a separate battery. The foot movements are by detachments, platoons, or batteries, as prescribed in the school of the battery; those most practiced are the movements by platoon. It will be observed that the manœuvres on foot are very few and simple, but quite sufficient for this secondary branch of instruction.

School of the Regiment and Brigade.

This corresponds to our school of the battalion. The intervals between the mounted batteries is sixty-two paces, and between the horse batteries one hundred and two paces; at close intervals this is reduced to fifteen paces.

Management of the Artillery on the March and in Battle.

As a tactical principle, the artillery of the Germans marches and fights by battery division, and it rarely happens that a single battery is isolated for any purpose. So long as the batteries are not under fire the commander of the battery division remains with the general commanding the infantry or cavalry division to which the battery division is attached, in order to thoroughly understand the progress of events, and to personally receive and promulgate the instructions and orders of the general; in other respects the battery divisions are commanded and employed very much like infantry brigades.

The commanders of batteries are not required to remain immediately with their batteries; on the contrary, they are authorized and are expected to hasten in advance, or rather in the direction of the enemy, whenever necessary to the proper management of their batteries. Their movements are restricted by the battery division commander only so far as to prevent tactical mistakes.

Since the Austro-Prussian war there has been quite a reform in the tactical employment of the German artillery. Before that war the corps artillery was styled "reserve artillery," and on the march its position was near the rear of column, and in battle its employment was deferred until towards the close, unless some special emergency brought it into action earlier. Named and regarded as a reserve and placed far in rear, it often failed to appear at the moment when the artillery is most needed, viz., at the commencement of a general battle.

During the Franco-Prussian war (or a short time before) the name of "corps artillery" was substituted for reserve artillery, and its management greatly changed; on the march it is nearer the head of column, so that it can be quickly brought into action.

After the battles of Forbach and Woerth, where the corps artillery of the Seventh and Eleventh Corps did not arrive in time, the management changed, and the Germans conformed strictly to the recommendations and prescriptions of the chief of artillery of the Guard, and with the most decisive and brilliant results. Thus, at Rezonville, the artillery of the Third Corps, notwithstanding delays caused by a march in the wrong direction, pushed ahead of the corps in line to take part in the struggle before the village, which continued all day. During the battle of Sedan the prince royal sent forward the artillery of the Fifth and Eleventh Corps escorted by a few squadrons; the artillery was established so as to complete the circle of fire which inclosed the French army. During the pursuit of the French Army of the Loire the corps artillery was pushed more and more towards the heads of columns, and although it may be said that the French were no longer very formidable, still the new principle seems to have been fully recognized.

In battle, and until troops are formed for the decisive attack, the corps artillery for the most part has been placed between the two divisions of the corps, and the battery divisions between the two brigades of the infantry divisions. At the moment of the main attack it takes a position on the flank, if possible, protected by cavalry. As a rule it is not permitted to place batteries behind other troops so as to fire over them. Fire is opened with the full number of guns and as unexpectedly as possible. Small detachments of artillery may disregard this principle and open fire, but not until they have been discovered and fired on.

The opening range for field artillery is between two thousand five hundred and three thousand paces, and it is seldom that it is advanced to within eighteen hundred paces (the best range) until the enemy's infantry has been shaken and his artillery compelled to deploy and open fire. The batteries once under fire are not relieved when out of ammunition; they await in position until the arrival of a supply. Being established at such a distance as to perfectly observe the effect of the shots, the positions are changed as little as possible, and a change of less than six hundred metres is not to be made save in exceptional cases.

In the March.

It has been before stated a battery consists of six guns, eight caissons, three battery-wagons, one forge, and the reserve in men and

horses. When not in the vicinity of the enemy the first six caissons each follow the piece which bears the same number, then come the two remaining caissons, battery-wagon No. 1, the forge, battery-wagons 2 and 3, and the reserve in men and horses; when in proximity to the enemy the order of march is changed by the command "Form echelon," when the battery is divided into three parts, viz., the six guns and first and second echelons. The first echelon is commanded by an officer, if one is available, otherwise by a non-commissioned officer, and follows the guns; it consists of four caissons and battery-wagon No. 1 (carries two stretchers), two non-commissioned officers, medical officer (if there be one with the battery), one chief and four assistant stretcher-bearers, besides two drivers with four horses harnessed, cannoneers, No. 6, of all the pieces, and twenty-four additional cannoneers. The second echelon consists of the remainder of the battery, commanded by a non-commissioned officer (quartermaster-sergeant), and follows some distance behind the first echelon. At the command "Form echelon," if all the batteries of a division are together, the second echelons are united under the command of an experienced officer, and follow immediately in rear of the corresponding infantry division. So much for the march.

In Battle.

The object of thus dividing the battery is to facilitate and insure the supply of ammunition, etc., and to shelter as much as possible all vehicles, men, and horses not required with the guns. The chief of the first echelon supplies the guns and replenishes from the second echelon. The chief of the second echelon in turn supplies the first echelon and draws from the first echelon of the division ammunition column of his regiment, formed near the field of battle. If necessary all the resources in men, horses, and material of the two echelons and munition columns are to be exhausted in maintaining the efficiency of the guns.

First Echelon of an Isolated Battery.

When the battery moves forward to take position it is followed by the first echelon until just before the guns are established for firing, when it takes a position about eighty or one hundred paces in rear of the least exposed flank of the battery, with very wide intervals, so that the carriages may reverse easily. As soon as the first echelon is in position its chief examines the ground in the vicinity, and sends a report to the captain explaining facility of communication, freedom of movement forward or to the rear, cover from enemy's fire, etc.

This done, he gives his entire attention to the supply of the guns, which he must follow with his echelon, if they move forward or by a flank, and precede if to the rear, and at the same gait.

As a rule the echelons keep off the roads, but if obliged to take them, they are to keep on one side, so as not to incommode other troops. The intimate connection between the first echelon and the guns is determined by the captain in all cases, as, for instance, when posted in advance of a defile, causeway, etc. When several batteries are united on the field and under the command of one officer, he may suspend the general rules in regard to the caissons.

The position of the first echelon in this case becomes more exposed, and it may be necessary to place some of the caissons behind their guns; the choice of a position for the battery now becomes of the highest importance, and the greatest consideration will be paid the configuration of the ground. If one of the batteries is withdrawn from the line, it is followed by its caisson.

The Second Echelon.

From his place in column the chief of the second echelon must maintain communication with the battery, and for this purpose he detaches a mounted man, who remains near the captain for the purpose of carrying his orders to the second echelon. When the battery takes position, the chief of the second echelon moves it within about eight hundred metres of the guns. The second echelon must be located so as to be easily seen by the non-commissioned officer who conducts the empty caissons from the first echelon, be screened as much as possible from the enemy, and be able to conform to the movements of the battery.

As soon as established the chief of the second echelon sends a mounted man to notify the chief of the first echelon where he is to be found. The officer commanding the second echelon of a battery division at the end of the column maintains communication with the commandant of the battery division, through a mounted man who carries his orders. When the batteries take up a position for firing, he conducts his command to a point about eight hundred metres from the division, and at once gives notice of his position to the commanders of the division and batteries. After the battle the commander of the second echelon is notified of the place of cantonment or bivouac, so that he will make no unnecessary marches, and will rejoin the batteries as soon as possible.

Supplying Ammunition.

The ordinary routine of supply is as follows:

Whenever half of the shells in the gun-limbers have been fired, and in fact whenever a favorable opportunity offers, the captain must replenish from the first echelon. When it is necessary to do this with

great rapidity, the chief of the first echelon sends forward two caissons, which are placed before the limbers of the second and fifth pieces, ten paces from the heads of the horses. In some cases, as when the caissons are close up by the guns, the ammunition can be served direct from them, so as to keep the complement in the gun-limbers intact. The wounded are carried to the first echelon, where their wounds are hastily dressed, and where disabled horses, broken wheels, and limbers are replaced. The commander of the first echelon draws from the second, and to do this he empties two of the caissons as soon as possible by transferring the ammunition, and sends them at a trot, conducted by a non-commissioned officer, to the second echelon, where they are exchanged for two loaded caissons; the latter are brought back to the first echelon by the same non-commissioned officer. If during the interval the first echelon has changed position, its chief must send a man to notify the non-commissioned officer of the whereabouts of the first echelon.

The second echelon is required to supply the first echelon and the battery, and for this purpose must be prepared to sacrifice all of its resources in men, horses, and material, no matter in what condition it may be left by so doing. If the second echelons of a battery division are united, each supplies his own battery; and should one of the second echelons exhaust its supplies, the commandant of the division decides whether the battery to which it belongs shall be supplied by a neighboring echelon or not.

The second echelons draw from the ammunition columns of its regiment formed near the field of battle, whose whereabouts is communicated to all the batteries by its commandant as soon as it arrives. On receiving this information the chief of the second echelon examines the ground between him and the first echelon of the munition column, and sends a mounted man to find specially where the wagons are located. The empty caissons of the first echelon having been exchanged for loaded caissons of the second echelon, are refilled as soon as possible from the ammunition column. In every ammunition-wagon (caisson included) there are blank ammunition receipts, which the party receiving the ammunition must sign in duplicate. One is left with the commandant of the munition column, and the other given to the commandant of the battery.

After a battle or march all empty caissons are sent to munition columns to be filled, together with all damaged material worth repairing. The second echelons join their batteries, and their resources are at once utilized in restoring their efficiency.

The union of fractions of troops with the echelons and batteries, as, for example, the cartridge-caissons of the infantry, is prohibited as prejudicial to the rôle of the echelons, and likely to interfere with their efficiency. On the contrary, the munition-wagons of a cavalry division

may be united with those of the horse batteries of the division, if the general commanding the division so orders.

I have been thus particular in describing the supply of munitions because it is a service for which we in this country are poorly prepared, and which in another war will be the most delicate problem to solve. It will be folly to undertake a campaign of any extent without a careful analysis of this question, and the most thorough arrangement of all details bearing on the formation, administration, and equipments of ammunition-trains.

That they should be something more than a collection of mule-wagons, driven in many cases by cowardly, inexperienced teamsters, and in charge of officers unfamiliar with their contents, I think is generally acknowledged. In making them a part of the artillery, and adjuncts or auxiliaries, as it were, of the batteries, their efficiency is assured and the supply of munitions made a certainty.

Remarks.

The field and foot artillery inspections constitute a feature peculiar to the artillery of Germany, and is one which greatly adds to its efficiency and lightens the duty of the inspector-general. In time of war the field artillery inspections give place to the corps commanders, who are supreme, and who manage the artillery through the chiefs of artillery of the corps. The artillery inspectors are then transferred to the headquarters of the different armies, where they are occupied chiefly with questions of supply. As the status of the foot artillery is very much the same in peace and war, and, except in the event of a siege, its duties are confined to the fortresses and garrisons, its management remains unchanged, when mobilization is ordered, and the foot artillery staff is further occupied with the supervision of the depots of the field artillery regiments which have marched out of the corps districts.

The formation of the batteries into "battery divisions," the union of two regiments to form a brigade, and the distribution of the service as divisional and corps artillery, is in perfect harmony with the corps organization of the German army.

The peace strength of the regiments is eight or nine batteries, which is increased in time of war by the establishment of a depot of two batteries, the five division ammunition columns, and the tradesmen division. The battery divisions correspond to the infantry and cavalry divisions, and are the administrative and tactical units of the field artillery.

The peace strength of the regiments is two battery divisions of four batteries each, or three battery divisions of three batteries each, which experience has shown to be a command suited to the rank of colonel, and neither too small nor too large for his personal supervision

and management. The details of the batteries are left to the field-officers and captains, while the colonel exercises a general supervision over the battery divisions and ammunition columns, and is occupied chiefly in maintaining a full supply of horses, men, and material. The organization of the division ammunition columns renders this an easy matter, as the wagons for the transport of ammunition are the same as those in the batteries (caissons), the horses have the same attachment, and the *personnel* being drawn from the artillery is thoroughly instructed and able to replenish deficiencies. The manufacture and supply of all munitions and material devolves on the artillery, both in peace and war, and the duties and details of the division columns are arranged with as much precision as those of the batteries.

As compared with other artilleries, the most prominent characteristic of the German organization is the manner of appointing officers, the large proportion (seventy-five per cent.) taken from civil life who receive nearly their entire professional education after they have become ensigns and lieutenants, finding a parallel in no other country. Some of the reasons for this have been given, other reasons are the limited instruction of the cadet schools, which are not designed to impart much more than a general education, and, finally, motives of economy and a desire to popularize the army and facilitate the supply of intelligent officers by drawing directly from the people. The system of education in Germany requires every man who can do so to defray the expense of his general education, and this principle extends even to the military cadet schools, where but few pupils are educated entirely at public expense. It is not until he has *chosen the army as a profession*, and his parentage, morals, manners, and attainments as a man are known, that the government incurs any expense on his account.

The German engineers are chiefly recruited in the same way, and the officers of these two arms are equal in ability, zeal, and professional experience to those of any other army in the world. The plan of sending intelligent non-commissioned officers of artillery to the Oberfeuerwerkers school, to fit for the service of artillery material, is without doubt excellent, if not the best that could be devised. By this means advancement to the grade of captain surely awaits intelligent and meritorious non-commissioned officers of artillery. Brought up and educated, as it were, in the artillery, and trained by artillery officers, by whom they are subsequently commanded, the proper relation between the service of command and that of material is continually preserved, and harmony and efficiency result.

Another feature of the artillery organization of Germany which has come to be much followed is, that nearly if not quite every grade has its "Aspiranten" (aspirants), who pass a period of probation more or less continued to test their fitness before being appointed; this, taken in connection with the principle (which though not invariable is general)

requiring the non-commissioned officers to engage to re-enlist before appointment, secures men of experience and influence in the ranks. Finally, the course of instruction of the German artillery is well worthy of imitation. In the first place, it is designed to cover all grades and degrees of intelligence, and the text-books of the schools are specially arranged to meet that object. Commencing with the battery division school, where the instruction is elementary, the persevering and intelligent private soldier prepares for admission to the regimental or brigade school. This course commences where the other ends, and so on through the Oberfeuerwerker school. All the text-books are prepared by the artillery staff. Each course is complete in itself, and embraces just as much and no more than is necessary for the next step in advance, so that when non-commissioned officers complete the Oberfeuerwerker school they are prepared for the examination which precedes their subsequent appointment to the grade of Feuerwerks lieutenant.

Such, too, is the method observed in regard to the officers, who are never allowed to be idle. Entering the army for the most part from choice after they have been fairly educated, they pass three years in diligent professional study, and thereafter they continue to progress. Each month of the year has its unfailing and appropriate duties, which are to be performed systematically and uniformly in every regiment and battalion of the artillery. The winter months devoted to theory, the summer and fall to practice. The conferences, lectures, essays, and war-games are regulated so as to develop the best and poorest intellect, and no officer looks forward year after year to the repetition of a threadbare course of study and investigation, for these must keep pace with his length of service and experience. Each year the conferences, essays, lectures, and war-games cover new ground and fresh problems, and no point of organization, tactics, gunnery, or technology, as applied to artillery, is overlooked. Thus every officer and soldier keeps continually before him the details as well as the higher and grander principles of his art, and passes from a peace to a war footing with absolute longing to test not only his nerve but his knowledge.

Such is the organization, and especially the administration, of the German artillery, which from the time of Frederick to the present day, with some exceptions, has been advancing straight to its present efficiency. After or during every war in which Prussia has been engaged, reforms either in the *personnel*, material, or employment of the artillery have been made; and, as if never satisfied with appearances, the German artillery officers have overturned and turned over every detail, testing each part not only as a thing in itself, but as a link, as it were, in the armor upon which Prussia has come to rely so fully. The Germans are essentially a practical people, and the brilliant scientific men of Germany who have shed such glory on the nation would have now but

little fame had they not been as they were and are, both practical and scientific, able to study differences as well as resemblances, and to separate the resemblance of relations from the resemblance of things, and who mistake not mere figures of speech for reasoning.

That the artillery of Germany is what it is, a model which all other European states are rapidly imitating, is due to the idea of *progress* which prevails throughout the entire army, which shatters idols however sacred, and breaks down traditions whatever their antiquity, the moment they interfere with or retard scientific investigation and that severe analysis which lies at the root of all beneficial laws and all durable and efficacious systems.

"The organization of the army is to be maintained in harmony with the progress of science," is the maxim which the Germans have adopted; and by this is meant not only the development which scientific men are making in the material world, but in the subtler and deeper regions of character, which involve a study of man not only as a machine in the hands of despotic power, but as an intelligent, self-reliant being, with affections, hopes and fears, strength and weakness, both moral and physical, and a sense of obligation which underlies every good action, and is the source of the highest professional and personal power.

To be of the "corps of officers" is in Germany to be above the suspicion of baseness, and this feeling fostered with such care by the military has taken root among the people, and finds expression in the reverence and affection with which the army is almost universally regarded notwithstanding the great strain on the country. I was told at the house of a friend in Berlin "that the highest ambition of every true German lady was to marry an officer, because they were sure of sharing the fate of a gentleman," which, as an expression, was sufficiently forcible whether it stated a fact or not. The study of character then, and how to fully develop it, is as much a part of the German artillery system, as the study of guns, powder, and shot, and though not so fully moulded to the will of the investigator, is nevertheless an element in the problem which is always kept in view. The first requirement of an artillery officer is "an honorable character and mode of life." In fine, he must not only be a man of honor when appointed, but he must remain so; and the German system does not permit an officer to associate with or serve beside a companion even *charged* with disgraceful conduct, until he has publicly cleared himself.

Hence honor is prized above life itself, and the officer who cannot or will not take this view of the matter and shape his conduct accordingly, must quit the service.

I regret that I have not developed more fully the plan of German artillery organization. Believing that I would attend the autumn manœuvres with Generals Upton and Forsyth, I made no preliminary

investigation of the subject, which I postponed in the vain hope of learning the general plan, and many of its most important details, when daily association with the German artillery officers would have made this comparatively easy. An obstacle which could not be foreseen, and which when it arose could not be removed, and which was duly communicated to the War Department, prevented our attendance at the German autumn manœuvres, and consequently several important points of organization and administration were unknown to me until just before I left Berlin, when it was too late to prosecute further inquiry. Such, for example, were the precise duties of the artillery committee, the manner of promoting the Feuerwerks *personnel*, the special requirements, if any, for duty in the technical artillery, and the programme of examination for promotion.

In concluding this paper, I wish to add that it no doubt contains some inaccuracies, due to the changes of the past two years. Such changes I am informed are not material. Even if they were, this gives us a starting-point and basis of investigation, which it is to be hoped may be readjusted and reconstructed by some officer having more recent information.

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HOW MARINERS MAY CO-OPERATE WITH THE LIFE-SAVING SERVICE.

It is very desirable that mariners should possess certain knowledge with the view of enabling them to effectually co-operate with the crews of the life-saving stations upon the coast in efforts to rescue persons from their vessels when wrecked or imperiled. The intelligent co-operation of those on board with the station-men upon the beach would at such a time greatly facilitate life-saving operations, whether with the boat, the breeches-buoy, or the life-car, and it is proposed in this article to supply, in as concise a manner as possible, the information requisite to this end.

Life-saving stations, life-boat stations, and houses of refuge are located upon most of the dangerous points of the Atlantic and Pacific sea-board and the gulf and lake coasts of the United States, those in operation at present numbering one hundred and eighty-three.

All stations on the Atlantic coast from the eastern extremity of the State of Maine to Cape Fear, North Carolina, are manned annually by crews of experienced surfmen from the 1st of September until the 1st of May following.

Upon the lake coasts the stations are manned from the opening until the close of navigation, and upon the Pacific coast they are open the year round, but are not manned, being dependent upon volunteer effort from the neighboring people in case of shipwreck.

All life-saving and life-boat stations are fully supplied with boats, wreck-gun, beach apparatus, restoratives, etc.

Houses of refuge are supplied with boats, provisions, and restoratives, but not manned by crews; a keeper, however, resides in each throughout the year, who after every storm is required to make extended excursions along the coast with a view of ascertaining if any shipwreck has occurred, and finding and succoring any persons that may have been cast ashore.

Houses of refuge are located exclusively upon the Florida coast, where the requirements of relief are widely different from those of any other portion of the sea-board.

Most of the life-saving and life-boat stations are provided with the International Code of Signals, and vessels can, by opening communica-

tion, be reported or obtain the latitude and longitude of the station where determined, information as to the weather probabilities in most cases, or, if crippled or disabled, a steam-tug or revenue-cutter will be telegraphed for, where facilities for telegraphing exist, to the nearest port if requested.

All services are performed by the life-saving crews without other compensation than their wages from the government, though, in view of the meagreness of their pay, they are not prohibited from receiving such rewards for labor performed or risks incurred at wrecks as owners or masters of vessels or other persons may see fit to voluntarily bestow upon them, but *they are strictly forbidden to solicit such rewards.*

Destitute seafarers are provided with food and lodgings at the nearest station by the government as long as necessarily detained by the circumstances of shipwreck.

The station crews patrol the beach from two to four miles each side of their stations four times between sunset and sunrise, and if the weather is foggy the patrol is continued through the day.

Each patrolman carries Coston signals. Upon discovering a vessel standing into danger he ignites one of them, which emits a brilliant red flame, of about two minutes' duration, to warn her off, or should the vessel be ashore, to let her crew know that they are discovered and assistance is at hand.

If the vessel is not discovered by the patrol immediately after striking, rockets or flare-up lights should be burned, or if the weather be foggy, guns should be fired to attract attention, as the patrolman may be some distance away on the other end of his beat.

Mariners driven ashore anywhere in the neighborhood of the stations, especially on any of the sandy coasts where there is not much danger of vessels breaking up immediately, should remain on board until assistance arrives, and under no circumstances should attempt to land through the surf in their own boats until the last hope of assistance from the shore has vanished. Often when comparatively smooth at sea a dangerous surf is running which is not perceptible four hundred yards off shore, and the surf, when viewed from a vessel, never appears as dangerous as it is. Many lives have been unnecessarily lost by the crews of stranded vessels being thus deceived and attempting to land in the ships' boats.

The difficulties of rescue by operations from the shore are greatly increased in cases where the anchors are let go *after entering the breakers,* as is frequently done, and the chances of saving life correspondingly lessened.

The patrolman, after discovering a vessel ashore and burning a Coston signal, hastens to his station for assistance. If the use of a boat is practicable, either the large life-boat is launched from its ways in the station and proceeds to the wreck by water, or the lighter surf-boat is

hauled overland to a point opposite the wreck and launched, as circumstances may require.

Upon the boat reaching the vessel, the directions and orders of the keeper (who always commands and steers the boat) should be implicitly obeyed. Any headlong rushing and crowding should be prevented, and the captain of the vessel should remain on board, to preserve order, until every other person has left.

Women, children, helpless persons, and passengers should be passed into the boat first.

Goods or baggage are not taken into the boat until all are landed. If any be passed in against the keeper's remonstrance he is authorized to throw the same overboard.

When it is inexpedient to use either the life-boat or surf-boat, recourse is had to the wreck-gun and beach apparatus for the rescue by the breeches-buoy or the life-car.

A shot with a small line attached is fired across the vessel.

The line should be seized as soon as possible and hauled in until a tail-block with a whip or endless line rove through it is received. This tail-block should be hauled on board as quickly as possible to prevent the whip drifting off with the set or fouling with wreckage, etc. Therefore, if the sailors have been driven into the rigging, where but one or two men can work to advantage, the shot-line should be cut and run through some available block, such as the throat or peak halyards block, or any block which will afford a clear lead, or even between the ratlines, that as many as possible may assist in hauling.

Attached to the tail-block will be a tally-board, with the following directions in English on one side and French on the other:

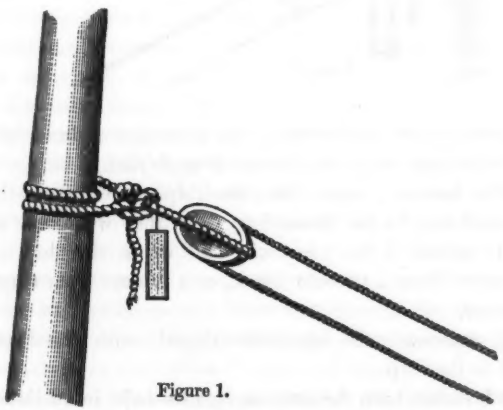


Figure 1.

"Make the tail of the block fast to the lower mast, well up. If the masts are gone, then to the best place you can find. Cast off shot-

line, see that the rope in the block runs free, and show signal to the shore."

The above instructions being complied with the result will be as shown in Fig. 1.

As soon as the signal is seen, a three-inch hawser will be bent on to the whip and hauled off to the ship by the life-saving crew.

If circumstances will admit, the sailors can assist the life-saving crew by manning that part of the whip to which the hawser is bent and hauling with them.

When the end of the hawser is got on board, a tally-board will be found attached, bearing the following directions in English on one side and French on the other:

"Make this hawser fast about two feet above the tail-block, see all clear, and that the rope in the block runs free, and show signal to the shore."

These instructions being obeyed the result will be as shown in Fig. 2.

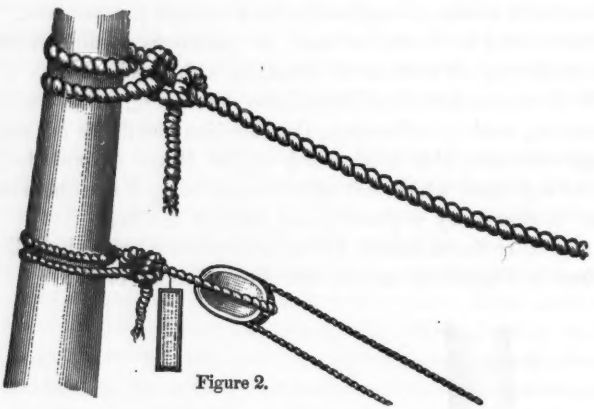


Figure 2.

Particular care should be taken that there are no turns of the whip-line round the hawser before the hawser is made fast.

When the hawser is made fast, the whip cast off from the hawser, and the signal seen by the life-saving crew, they will haul the hawser taut, and by means of the whip will haul off to the ship a breeches-buoy suspended from a traveler-block, or a life-car from rings, running on the hawser.

Fig. 3 represents the apparatus rigged, with the breeches-buoy hauled off to the ship.

If the breeches-buoy be sent, one man should immediately get into it, thrusting his legs through the breeches. If the life-car, the hatch should be removed, as many persons placed inside as the car will hold (four to six), and the hatch secured on the outside by the hatch-bar and

hook. Signal should then be made as before, and the buoy or car will be hauled ashore. This will be repeated until all are landed.

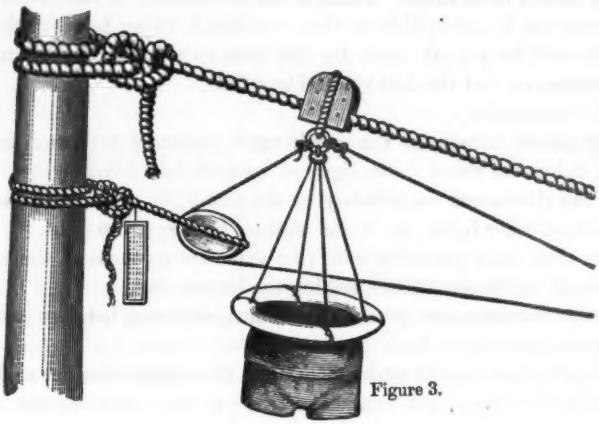


Figure 3.

On the last trip of the life-car, the hatch must be secured by the inside hatch-bar. In many instances two men can be landed in the breeches-buoy at the same time by each putting a leg through a leg of the breeches and holding on to the lifts of the buoy.

Children when brought ashore by the buoy should be in the arms of older persons or securely lashed to the buoy. Women and children should be landed first.

In signaling, if in the daytime, one man should separate himself from the rest and swing his hat, a handkerchief, or his hand; if at night, the showing of a light and concealing it once or twice, would be understood; and like signals will be made from the shore.

Circumstances may arise, owing to the strength of the current or set, or the danger of the wreck breaking up immediately, when it would be impossible to send off the hawser. In such a case a breeches-buoy or life-car will be hauled off instead by the whip, or sent off by the shot-line, and the sailors will be hauled ashore through the surf.

If the vessel is stranded during the night and discovered by the patrolman, which will be known by his burning a brilliant red light, a bright lookout should be kept for signs of the arrival of the life-saving crew abreast of the vessel.

From one to four hours may intervene between the burning of the light and their arrival, as the patrolman will have to return to his station, perhaps three or four miles distant, and the life-saving crew draw the apparatus or surf-boat through the sand or over bad roads to where the vessel is stranded.

Lights on the beach will indicate their arrival, and the sound of cannon firing from the shore may be taken as evidence that a line has

been fired across the vessel. Therefore upon hearing the cannon strict search should be made aloft, fore and aft, for the shot-line, for it is almost certain to be there. Though the movements of the life-saving crew may not be perceptible to those on board, owing to the darkness, the ship will be a good mark for the men experienced in the use of the wreck-gun, and the first shot seldom fails.

To recapitulate:

Let sailors remain by the wreck until assistance arrives from the shore, unless the vessel shows signs of immediately breaking up.

If not discovered immediately by the patrol, let them burn rockets, flare-up, or other lights, or, if the weather be foggy, fire guns.

Let them take particular care that there are no turns of the whip-line round the hawser before making the hawser fast.

Let them remember to send the women, children, helpless persons, and passengers ashore first.

Finally, they should make themselves thoroughly familiar with the foregoing directions, and remember that on their coolness and strict attention to them will greatly depend the chances of success in bringing all on board safely to land.

THE SETTING-UP OF SOLDIERS, HORSE AND FOOT.

(Concluded from page 349.)

§ 31. We think that if we have succeeded in stating clearly what was to be said of the snake's movements, any of our right-handed readers may now—by attempting to carry out in the chest S the actions we are about describing, and paying no further attention to the head-joint than to keep it free and thus avoid its interference with the movements of the trunk—make a partial verification of the theory proposed so far as setting-up is concerned.

The various muscles render it possible to institute the proper actions in the separate parts without commencing at the originating points.

It must be particularly remembered that the influence of the leading movement is to be maintained throughout, else the parts become disjointed, and the action as a whole is incomplete.

Neither in this, nor in any of the exercises proposed, is the slightest *forcing* to be used. Any call for it shows that some step in the course of the movements has not been fully carried out, or has been mistaken.

The head must be held up. The chin elevated and carried forward, so that, the head-joint being free, no stiffness in the neck shall check the movements, and, for a similar reason, the hip-joint articulations must be allowed free motion.

The preliminary description of the actions in a single C, the rear one, seems necessary before giving those for the whole S, but the working on one C is not recommended as a habitual exercise; for, unless the motion *b* is very fully carried out, an unpleasant compression of the upper extremity of the left lung in the first section is produced.

§ 32. Each division of the various actions is headed by the symbol which indicates the accompanying movement of the head-joint; and it may be well before proceeding further to recapitulate these symbols and their connections.

x, Fig. 6, accompanies the primary tractions of the line x, Fig. 7, in the 4th and 2d sections; or, as they may be called, Fig. 4, the "propeller sections" of the S.

x′ accompanies the secondary tractions of the line x, in the 1st and

3d sections, where, in connection with the posterior line y, it gives a double twist to the ribs of these sections.

y, Fig. 6, accompanies the primary tractions of the line y, Fig. 7, in the 1st and 3d, or, as they may be called, Fig. 4, the "bearer sections" of the S.

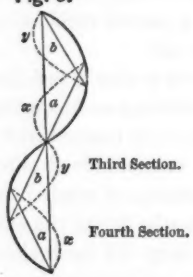
y′ accompanies the secondary tractions of the line y in the 4th and 3d sections, when, in connection with the anterior line x, it gives a double twist to the ribs of these sections.

The same letters in *Italics* represent the reverse movements.

It will be noticed that for equalizing the right-handed deformity, x and y are always in Roman letters, and, excepting for double action, *a* and *b* always in *Italic*.

(x) The ribs on the fourth section concave turn outwards, beginning below. This comes in the formation of the new (right) anterior line, as it subtracts from the inward turning of the old (right) posterior line in the third section convex (Fig. 7). In Fig. 8 it is indicated by

Fig. 8.



the broken line x. (*b*) In the third section on the convex the spine is to be flattened, beginning at the upper end. This follows on the giving off of the inner turning just taken from the old posterior line in this section. In the figure it is indicated by the full line *b*. (y) The ribs on the third section concave take an inward turning, beginning above. This comes in the formation of the new (left) posterior line as it subtracts from the outward turning of the old (left) anterior line in the fourth section convex. In the figure it is indicated by the broken line y. (*a*) In the fourth section, on the convex, the spine is to be flattened, beginning at the lower end. This follows on the giving off of the outward turning, just taken from the old anterior line in this section. In the figure it is indicated by the full line *a*.

For the following paragraph the actions are not indicated in Fig. 8. They all belong to the cross-joint movements of the ball and socket. (y′) The ribs of the fourth section convex now take an inward turning. This comes in the formation of the new (left) posterior line in the fourth section convex as it subtracts from the outward turning existing in the

old (left) anterior line in the third section concave. In taking this turning the ribs accommodate themselves at their articulations to the variation in facing occasioned by the flattening of the spine, *a*. (*a'*) The actual movement of the spine becomes less at every step. It now, by coming into a straight line at the concave of the third section, adjusts the rib articulations taken in y. This follows on the giving off of the outward turning just taken from the old anterior line in this section.

(x, *a*) *Double-turning.*—The preceding action *a'* would be immediately followed by x' and *b'*, but so soon as the inward turning of y' has been completed by *a'*, the old (left) anterior line and the new right anterior line in the fourth section, although their turnings are opposed to each other *laterally*, now find their similar *forward* directions coincident, and join their motions, so that the inward turning of the ribs is on both sides forced towards the ground (breast-bone in man) and the outward turnings alone remain at the articulations. (x') As the double action advances in the fourth section, the ribs of the third section convex take an outward turning. This comes in the formation of the new (right) anterior line, as it subtracts from the inward turning of the old (right) posterior line in the fourth section concave. In taking this turning the ribs accommodate themselves at their articulations to the variation in facing occasioned by the flattening in *b*. (*b'*) The spine on the concave of the fourth section now comes into a straight line, and completes the adjustment of the rib articulations. This follows on the giving off of the inward turning, just taken from the old (right) posterior line in this section.

(y, *b*) *Double-turning.*—So soon as the outward turning of the new anterior line in the concave of the fourth section has been finally completed by *b'*, the original inward turning of the third section convex, having been reduced to its equalizing proportion, is free to join the acquired inward turning of the concave of the same section; the two unite, as did the outward turnings of the fourth section, the outward turnings of the ribs of both sides are forced towards the ground (breast-bone), and the inward turning alone remains at the rib articulations in the third section.

By the two double-turnings, the two convexes of which are possible in each C C, according to the pair of diagonals which may be working, are, when these diagonals thus work simultaneously, united in the convex of the resulting arch; the two concaves pass below.

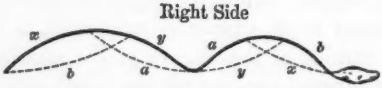
§ 33. The action in the sections of both C C being strictly analogous, we find, on tracing the combinations of the traction lines which result from suppressing the lateral shapes and bringing the spine entirely into the front-rear perpendicular plane, on the course just described. *First.* That the leading action is the straightening of the concaves by the turning of their ribs, and that the "*leading movement*" was

the outward turning of the ribs on the fourth section concave. That the convexes were straightened by the flattening of the spine, following its straightening on the concaves, and their ribs following instead of leading. That the final action, just previous to the concluding double-turning is, therefore, the one with which the course was begun, and which should continue repeating itself throughout, viz., the outward turning of the ribs of the fourth section concave, and the straightening of the spine following it. It will be seen farther on that in the course just described (*i.e.*, the formation of the right anterior line leading) the traction continually tends towards the right, and fixes itself to the right upper corner of the breast-bone until the double turnings bring all to the centre. (In a similar manner, when the formation of the left posterior line leads, the traction tends to the left, and fixes at the left shoulder-blade.) *Second.* That, after the equalization, the anterior lines are above in the fourth section, the posterior in the third, the anterior again above in the second, and the posterior in the first; also that this is precisely what would occur if, as we have derived the line sections, those taken from the concaves of the old lines pass below, those from the convexes above. In short, if we supposed the concave for both lines in the two combined diagonal pairs to form the concaves of the arches of combination, and the convexes of the lines the convexes of the arches. Thus we should have the lateral combinations of the old and new line sections as in the cuts.

Fig. 9.

Left Side

Right Side



The rib sockets having slipped on their articulating heads in the snake (or, the head in the sockets, in the higher animals), so that the diagonal relations are lost, the lines are kept in collateral relations, but on the slightest restoration of the old combinations in the head-joint these will be more or less restored in the spine.

After the collateral separation of the line sections in double-gathering, the reflected anterior pressure upward of the socket against the ball, in front, will again have place, but it comes now from the socket being drawn away from the direct-, not the diagonal-rear.

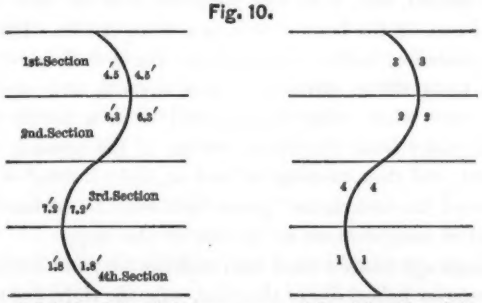
§ 34. We will next give the *course of equalizing for the full S*, but must remark that, in man, so large a portion of the movement of the upper C cannot be completed, until the interposed limb movement is made, as to embarrass considerably the attempt in the simple chest S.

The full passage of the anterior line into the upper C, and the full passage of the posterior line into the lower C, are marked by such a decided effort, that we must increase our symbols by prefixing the figure 2 to the letters when it is intended to denote the working of either in the C directly next to its originating point,—thus, 2*a*, 2*a*′, 2*a*, 2*a*′, 2x, 2x′, 2x, 2x′ represent the anterior lines in the upper C; 2*b*, 2*b*′, 2*b*, 2*b*′, 2y, 2y′, 2y, 2y′, the posterior lines in the lower C. So far as the head-joint is concerned, the figure 2 merely signifies a repetition of the action.

For the full S then we shall have (x) the ribs of the fourth section concave take outward turning; (*b*′), the spine on the third section convex flattens, but (2x) instead of the ribs on the third section concave, in the next place, taking inward turning, the ribs of the second section concave take outward turning, and following this (2*b*) the spine of the first section convex flattens. (y) The ribs of the first section concave now take inward turning, followed (2*a*) by the flattening of the spine in the second section convex (2*y*), the inward turning of the ribs in the third section concave, and (*a*) the flattening of the spine in the fourth section convex.

There remain now the new (left) posterior line in the fourth section, the new (right) anterior line in the third, the new (left) posterior line in the second, and the new (right) anterior line in the first, by the adjustment of the ribs on the convexes, as also the corresponding diminutions of the old lines in the diagonal sections by the straightening on the concaves yet to be completed. The movements for all these are much less than for the first set, and they are formed almost along

Fig. 10.



1, 2, 3, &c. Order of the first set of sections formed.
1′, 2′, 3′, &c. Order of the second set.

Order of formation of the double turnings.
1 and 2 outward turnings.
3 and 4 inward turnings.

with the final double collateral tractions, but in the order fourth section and second section, outward turning; first section and third section, inward turnings.

§ 35. There seems little more to be said of the action of those vertebræ which are raised from the ground, and added to the move-

ment of the head-joint, by the snake, excepting that, in addition to their use as described in § 22, they provide for any eccentric traction at the front end of the first S, beyond what can be met by the elasticity of the ribs, this being corrected by their movements on one another, so that the head and eyes shall not be drawn from the line of direction.

In the higher animals the action of the vertebræ which the snake detaches from the ground still exists in what we have called the "*neck-root joint*" (*i.e.*, the two upper vertebræ of the back and, perhaps, the lowermost of the neck vertebræ). The neck, added to and interposed between this and the head-joint, serves to take up from it the motion of the trunk and conjoin this with the movement of the limbs. The limbs have a complete torsion movement of their own, on which account the neck must form a complete S. By the division of the head-joints into two separate parts, each representing one side of the snake ball and socket, and by the angular divergence of these parts in rear, provision is made for its *special action* with the limbs alone, and also for its general action with them and the trunk combined.

§ 36. It seems proper, after describing the movements of the snake's spine ribs and head-joint, with the supplementary vertebræ of the last, to add here the connection between the *working of the helical lines and the eyes.* We here refer to the peculiar arrangement, common to the eyes of the snake and to those of higher animals,[11] by which the line of sight is kept steady, while a torsion is allowed to the muscles which move the eyeball, and, also, a straining-point is provided for the torsions collected at this part. There are muscles which serve to move the eye in every direction; these are attached by one end to some part of the eyeball, and, with one exception, pass to their attachment by the other end, on the bony socket, in a straight line. This exception is the *inner muscle of each eye*, which rolls the eyeball (referring to the inner side) from above downward and inward, and against which the strain comes when other muscles roll it in a contrary direction. This muscle passes from the upper surface of the eyeball, at first, directly inward, and then, turning to the rear, slides through a loop, fixed to the inside of the socket, and passes backward, to be finally attached to the socket at some distance in the rear of the loop.

These inner *eye muscles work each with the diagonal anterior and the collateral posterior helical line of the spine,—i.e.* the right eye muscle with left anterior and right posterior line, the left eye muscle with the right anterior and left posterior line.

The sides of the head-joint being in the reversed relation, *each eye muscle works with the diagonal side of the head-joint.*

[11] The writer has, of course, made the following anatomical descriptions clear only to the extent of his very limited ability; but as the common plates of human anatomy are easily consulted, and as these will answer every purpose, this is of less consequence than it otherwise might be.

We shall call the *rolling of the eyeball* by which its *upper surface* is carried *outward and downward* its *outward turning*, and that by which it moves in the contrary direction its *inward turning*. *A rolling motion* around the line of its length in either *inner muscle*, which, in the outer section of the muscle, would turn it *from above downward and backward* and in its posterior section *from above downward and outward*, we shall call *outward turning;* a rolling motion in the contrary direction, *inward turning*.

In its movement with the left anterior line and the left ball of the head-joint, the right eyeball rolls relatively or actually outward and its muscle actually. This outward turning begins at the outer end attached to the eyeball and passes to the inner end attached to the socket, that part of it which goes with the fourth and second sections of the anterior line, and with the rotation of the head-joint ball backward and inward (*a*), having place in the portion of the muscle exterior to its loop, and that part which goes with the passage of the head-ball across its socket to the front (*a'*) in the portion posterior to the loop.

In its movements with the posterior helical line the same muscle rolls in the opposite direction and beginning at its posterior end; the part which goes with the line in the first and third sections, and with the rotation of the head-socket forward and inward (*b*), being the posterior portion of the muscle; with the passage of the pressure of the socket across the joint to the rear (*b'*) the anterior portion. Both portions thus, like the ribs, become double-twisted.

These torsions are secured in place by the persistence of the eyeball in its outward turning position, and by their *appui* on the loop.

The two inner eye muscles act with each other in the compression, and absorption of the turnings, as do the helical lines. It will also be observed that—as in the head-joint—the *effective* workings of the posterior lines are represented by parts collateral with those of the anterior lines, so in the eye muscles these are joined.

Beginning an outward turning at the posterior end of the muscle does not go to an increase of the outward turning, but only reverses or undoes the inner turning which may exist, and, in like manner, an inner turning at the exterior end reverses the outer turning. Corresponding, as will be seen, with what is said of reversing the head-joint movements in § 24.

Of the one hundred and fifty or more pairs of muscles in the body, these eye muscles and another pair of muscles, also very slender, are the only ones arranged with loops. Of this latter pair, the "digastrics,"[12] we shall speak presently. From the peculiar arrangement brought about in both by the loops and from their position,—*i.e.*, the digastrics at the summit of the chest movements, and the inner eye muscles at the

[12] Whether the digastrics exist in the snake or not we are unable to say, but from our theory, we fancy that they do not.

summit of all the movements,—it cannot be doubted that they are cardinal pivots of motion. The lines of their actions give one of the best guides in carrying out the ophidian lines in setting-up, and we would ask particular attention to them.

§ 37. The snake has generally only one fully-developed *lung*, although there are indications of a second, and were both fully developed they would, we suppose, form each a long lung at their respective sides. The existing lung of the snake, tensely filled with air, forms an elastic cushion, on which the movements about it are not only steadied when producing contractions of the various parts of the chest and condensing the air, but are aided in the return spring by the re-expansion of the air and its rush into every part where more or less of a vacuum may be formed.

§ 39. *Additions to the body of the snake and necessary alterations for forming the locomotive machinery of quadrupeds and of man.*

It seems difficult to give the snake a place in the analogical series of animal frames without rather supposing it to have been stripped of its limbs than as having had limbs added, for it is of far higher organization than many creatures which have limbs, or at least their analogues, but we use the latter supposition for illustration.

1. The body of the snake is lifted from the ground and a substitute for the ground provided. This substitute, or artificial ground, consists of the breast-bone, the front of the pelvis, or hip-bones, and the muscles which join the breast-bone to the pelvis.

2. The body, thus lifted, and provided with an artificial ground, constitutes a *composite spine*, in which the workings of every part are founded upon the interior ophidian (or snake) movement of the spine proper as it is exerted upon the breast-bone. This *composite spine is based upon two S S*, one of which, the anterior, is provided with ribs and sustains the chest, the other is destitute of ribs, excepting so far as the hip-bones may be considered such, and sustains the loins and pelvis. The extreme upper part of the breast-bone is more particularly connected with the neck-root joint and neck.

3. To the composite spine four supports are given, viz., the *four limbs*. In man, the support taken upon the front limbs is, afterwards, brought back upon the posterior ones, so that these latter finally support the whole.

The *limbs may be regarded as ribs*, belonging to the anterior and posterior curvatures of the final comprehensive S curve, which is formed by a union of all the others. In each limb we have, instead of several ribs, one consolidated bone, and instead of elasticity we have joints; but their articulating union to what might be called the final composite spine is of the same nature, a ball-and-socket joint.

The anterior and, as comparative anatomists have shown them to be, *head limbs*, have another connection than the trunk, and one which

completely controls them; for their combinations with the anterior C C of the trunk, although they give force to the workings of the fore-limbs, are entirely and subserviently adapted to securing the combination of these latter with the neck.[13]

The *neck* consists of the seven free vertebræ, immediately below the head (unless, as we are inclined to think, the lowermost should be counted in the neck-root joint). These work as a full S with its lower end based on the neck-root joint (§ 35), which collecting all the tractions of the trunk puts them at the disposal of the neck. The neck, collecting those movements of the limbs which do not depend on the spine proper, unites them with the lines from the trunk, and the whole collects at the head-joint. Thus there is a *general* movement, in which the action of the neck may be described as that of a skeleton ball and socket, in which the upper C C formations represent the socket movement, the lower the ball movement, and with which, so far as the head-joint articulating surfaces work, they do so as a simple ball and socket, as in the snake; and a *special* movement, in which, working on the neck only as their basis, the separate parts of the double ball and socket of the head-joint have their peculiar application for the higher animals. If the special movement be used independently of the neck-root joint, it will first affect the limbs and the neck only, and then, by extension, the trunk, and with it the limbs again through their trunk connections.

The connection of the hinder-limbs with the neck is through the breast-bone, and, as will be explained farther on, through the lower jaw; but the fore-limbs have not only the connection of the neck muscles proper, but also that of the upper part of the breast-bone, through the powerful breast muscles.

The fore-limbs, at certain portions of the gathering, are so entirely dependent on the neck, that they stand in the same relation to its posterior curvature that the hinder-limbs do to the posterior curvature of the loin S; that is to say, where the neck forms a posterior convex to the left, the left fore-limb will take from it an outward turning; and since the convexes of all the S S S form similarly at each gathering, the hind-limb of the same side will also have outward turning; and, both *collateral* limbs depending on convexes, they will be both in *appui*. In this way, we shall have a *pacing* movement when the neck begins the action for the fore-limbs, the trunk for the hind-limbs. If the reunion of all the lines be thorough *through* the neck-root joint, we shall have the *pace*. If the through movement, on the contrary, be supplemented by an eccentric revolution of this joint, we shall have the *walk*. Both these are neck movements. The *trot* taking the diagonal fore-leg in its trunk combination with a hind-leg, is a body movement.

5. *The chest S, then, includes in its movements the ophidian-* (*or snake-*)

[13] It is the break in this combination which constitutes one of the main evils of one-handedness.

gathering; it then extends its gathering to the limbs, and over all is imposed an outer gathering from the neck S, which, working on the same lines, is drawn in so as to coincide as to its central working point, or "centre of force" (§§ 1, 46), *with the ophidian-gathering.* Different combinations of these workings produce all the gaits and movements of quadrupeds and of man.

§ 40. If the ophidian movement be granted for the chest, the solid union of the arms with the breast-bone, by means of the collar-bones, in man, would seem to establish our theory that the same outline of movement extends to the limbs.

§ 41. In man, it may be observed that each of the fingers and toes can, like each of the ribs, take both outer and inner bearing. Each of the hind-limbs represents, in its gathering, a full S, nearly; and each of the fore-limbs, completely. Thus the head-joint may at times couple itself with one of the limbs as it does with the neck-root joint, and produce an imperfect motion as to force, but one disconnected from that of the trunk. For want of space we cannot explain how the limb bones may be considered as the consolidation of five ribs and their digits,[14] as the reappearance of all five in man and some other animals, of two in the ox, and of one only in the horse.

§ 42. The *head-joint in man and quadrupeds* is divided into two pieces, corresponding to the action, by lateral halves, of the simple joint in the snake. Each of these pieces is of such a shape as to give two raised ovoidal surfaces on the base of the skull. These are set at an angle with each other, which opens to the rear, and they have their larger ends in that direction. The "*head-condyles,*" as they are called, are so placed that they inclose in their angle the front half of the circular opening, by which the continuation of the brain passes from the skull down the central hollow of the spine, and work in corresponding lateral sockets hollowed in the surface of the first vertebra of the neck. By their oblong shape the joints adapt themselves to the limb movements, which are much more elongated in the front-rear vertical plane than those of the snake. By their being set inclined towards each other in front, space is left so that the varying adaptations to the lateral movements through the neck may be made. In short, the head-joint and neck together are the required skeleton parts of a large ball-and-socket joint, of a depth equal to the length of the neck and cross-measures equal to the working of the shoulders.

§ 43. The *posterior limbs* have the movement of their curve, the loin S, combined in the trunk with that of the chest (or ophidian) S, by means of a broad muscle called the *diaphragm.* This, like a flooring across the middle of the trunk, forms a complete division between the chest, which contains the lungs, and the abdomen; and (together with the continuations of the muscle down the loin portion of the

[14] Digits denote fingers, thumbs, and toes by one word.

spine, called its pillars) acts here a part similar, so far as required, to the muscular parts moving both the neck-root joint and the neck, but in subordination to both of the latter. We mention this chiefly to complete the anatomical description, since the consideration of the diaphragm may be dispensed with in practical setting-up.

§ 44. The *lower jaw* is articulated with the head, on either side, by oblong joints, the central lines of which, passing from points in front of the ears, inward, and somewhat backward, under the skull, would, if prolonged, cross the front points of the "head-condyles" (§ 42), and meet at the centre of the brain-opening spoken of above. We do not intend to go into the examination of any conclusions which might be drawn from the direction of these lines, but would merely say that they seem to point out a concentration of the lines of torsion of the body against the anterior of the opening.

In the jaw articulations, the jaw carries the heads, or, as they are called, "jaw-condyles," the skull the sockets; these in man and the horse allow of a lateral play that gives inner and outer bearing. The lower joint constitutes a sort of final "*artificial ground*," on which the head works, pressing upon it the forces it receives from below. Inner and outer bearings, therefore, when spoken of as made by the jaw, are the reverse of those made by the ribs. A jaw-condyle leaning laterally so as to open somewhat the outside of the joint, has outer bearing, and so as to close it at the outside, inner bearing.

§ 45. We have already (§ 36) alluded to the *digastrics*. These are two long slender muscles, attached by their rear ends to the base of the skull one on each side of the "head-condyles," from which points they run convergently forward until they meet at the inside front surface of the lower jaw, below the two central teeth, and there take their second attachments. Sagging somewhat in the middle of their course, each passes through a *loop* on its own side of the windpipe, and they thus hold the lungs, which have no support but this and their rest on the flooring furnished by the diaphragm muscle (§ 43), suspended between the base of the skull and the front of the lower jaw. The lungs expand and contract with the movements of the ribs, the ribs move the breast-bone, and the breast-bone acts and reacts with the limbs. From this it is easily seen how intimately the digastrics must be included in the cycle of actions which go to make up a movement of the body, and what influence the positions of the lower jaw may have on these actions.

The resemblance between the digastrics and the inner muscles of the eyes (the description given for the eye muscles of the snake (§ 36) will answer equally for the higher animals) is obvious. With the exception of the change of sides,—*i.e.*, the digastrics, acting collaterally with the sides of the head-joints, not diagonally, as do the eyes,—their actions are similar. That part of each digastric in front of its loop rolls outward, beginning at the front attachment, to accompany the first stage

of the formation of the collateral anterior helical line; the continuation of the rolling movement through and behind the loop accompanies the second stage. That part of each digastric in rear of the loop rolls inward, beginning at its rear attachment, to accompany the first stage of the formation of its diagonal posterior line, and the continuation of this inward rolling through and in front of the loop accompanies the second stage. As with the eye muscles, too, a turning *outward*, beginning at the rear attachment, does not go to increase the outward turning, but only reverses the posterior line turning which may exist; and, in the same way, a turning *inward*, beginning at the front attachment, reverses the anterior line turning.

There is, however, this distinction between the action of the eye muscles and of the digastrics, that, whereas the action of the former may be divided into two pretty equal parts, viz., one which accompanies the ophidian action proper, and another which, after the introduction of the limb action, draws the whole into a general ophidian action, centring in the lungs,—the action of the latter, excepting what is necessary to keep the muscles tense, chiefly succeeds the limb action; when, the lower jaw being in place, the digastrics adjust its position with the general movement of the lungs.

§ 46. The *lungs* in man and quadrupeds fill the chest. They are divided by a front and rear perpendicular plane, and by an oblique plane inclined downward from rear to front, into four parts called "*lobes*," the two lower of which go with the lower C C of the chest S and their apppertaining "false ribs," whilst the two upper go with the upper C C and their appertaining "true ribs."[15] The upper part of the upper lobes is, thus, in the first section, the lower part in the second; the upper part of the lower lobes in the third section, the lower part in the fourth. The upper part of each lobe may therefore (Fig. 4) be called its "bearing section," the lower part its "propelling section."

The various air-tubes which come off from these lobes collect in the central space between them. Those from the lower lobes coming upward, those from the upper lobes downward. Here they all unite in a single tube, called the *windpipe*, which is suspended from the skull and lower jaw, as just described, by the digastrics.

The manner in which the tubes collect at the centre of the chest causes the drawing of the lower lobes to, first, and more directly, affect the lower jaw in its outer bearings (*i.e.*, to open the joint on its outer side). Conversely, the movements of the lower jaw more directly react on the lower lungs, on the false ribs, and on the posterior limbs. When

[15] Actually, one of the lobes is again divided, possibly for adjustment with the heart, which lies also in the chest. It may be added that there are "tip" pieces to the upper lungs, which, in "Radical Mechanics," are supposed to play an especial part with the neck-limb action, but introducing them is not essential to our present purpose.

a horse has the lower jaw set, it makes one piece with the head, and the bit combines the action of the cavesson on the head-joint, with its own action on the lungs, so that both lose in power; but, when the jaw is open, the bit draws it on to its outer bearings, and gives corresponding outer bearings to the hind-feet.

§ 47. It is also to be observed that the part of the upper lobes in the first section should remain constantly full of air and bearing upward, in order to support the strain which, as so often mentioned, comes on the front of the anterior C C, from the trunk-gatherings being forced against it.

The *centre of force* spoken of in the opening of the article comes at the centre of the lungs, between the four lung-lobes (§ 39, 5).

No man is perfectly set-up who does not feel the *front upper part of the chest raised full of air* as *the grand straining-board* for every action, in which, as the line of gravity is inclined to one side or the other, it adjusts the balance with the head, and to which it distributes force. Hence setting-up centres between the lung-lobes where we find the focus for the three combined gatherings (§ 39, 5), and not at the small of the back, which is merely a centre of the *detached* limb-actions.

§ 48. There remains only one more subject for description. This is the two muscles which, in man, are prominently displayed in the neck, as, passing from the upper corners of the breast-bone, they diverge, and finally fix themselves to the head, one behind each ear. It is easily seen that by these muscles, which are called the *sterno-mastoids*, either the head may draw up the breast-bone, or the breast-bone may draw down the head. When, the neck S being fully gathered, the lower C of its curve is thrust forward between them, the sterno-mastoids are drawn "taut," and they, with the muscles passing from the lower end of the breast-bone to the pelvis, steady the whole "artificial ground" (§ 39, 1).

The forming and discharge of the torsions, which are largely imposed upon the sterno-mastoids, are particularly connected with the third gathering action of the head when, the special condyle action with the limbs having succeeded the first simple action with the ophidian S, the head-joint, in combination with the neck and the neck-root joint, taking its central pivot at the junction of the two C C of the neck S (say one-third of its length from the head), finishes the gatherings and brings all to the lung centre. That they are fitted to act in this final neck movement is obvious.

§ 49. The course of the final helical lines which wind around the body when the three S S S, or torsion-gatherings,—viz., the "ophidian," the "composite spine," or trunk-gathering, including its effect upon the limbs, and the final gathering, or that of taking up the links by the neck and combining the whole in the chest,—are united, may be traced as follows:

The *left anterior line.* Through the left sterno-mastoid to the left upper corner of the breast-bone, around the right side of the chest to the back, to the left thigh-joint in rear, and to the left leg.

The *right posterior line.* From the right thigh-joint in front to the lower part of the breast-bone, around the left side of the chest to the back, to the right shoulder-blade, and by the back neck muscles to the rear of the right head-socket.

The *right anterior* and *left posterior* have similar courses in their appropriate directions.

§ 50. Although *locomotion* proper does not come within the scope of this article, it may be said that in the *trot* the horse begins the movement for either line of gathering with the internal or ophidian cycle, viz., the eye muscles and lungs with the chest S, and commencing a simple motion of the head-joint. The movement of these, after they have extended their influence to the centre of the neck, induces the external or limb cycle with the special movements of the head-joint parts. The whole is then completed by finishing the simple ball-and-socket action of the head-joint as combined with the neck and neck-root joint. This is repeated for the other diagonal gathering, and so on. In consequence of the commencement on the ophidian (or snake) cycle, the *appuis* are diagonal limbs.

In the *pace*, the movement begins with the special motion of the head-condyles. These act, down the neck, upon the limbs, and the fore-legs being in the same relation to the neck curvatures as the hind-legs to the curvatures of the spine, the *appuis* are on a fore- and hind-foot of the same side (§ 39, 4).

If the neck, in regard to the fore-limbs, and the trunk, in regard to the hind-limbs, do not thoroughly carry their connection across the neck-root joint; but in order to supplement this, the neck-root is merely passed from side to side; then the front- and hind-limbs act separately, the animal paces with the one set and trots with the other, and we have set down in succession a fore-foot and the diagonal hind, or a hind-foot and the collateral fore. According to the foot with which we begin the reckoning, the gait becomes a *walk.*

The *gallop*, a series of square jumps, is formed by the simultaneous action of both pairs of helical lines in a double trot.

The *full run* is a double pace.

The *canter* is a combination of the trot on one diagonal with the pace on the other superimposed, the two being combined in double action at the spring. This gait is inaugurated by throwing the head-joint into such a position that, although the lines are forming in double action, the one diagonal leads with the trot the other with the pace. This movement resembles the walk in several respects, but there is a partial carrying of the lines across the neck-root joint. The succession of the feet is somewhat similar, but the intervals between their movements are

unequal. If the canter is well performed, the condyles are released at each spring with an extra movement of the neck, perhaps supplemented by a slight toss of the head. As regards this latter, "the nodding motion of a good walker," Percival says, "is very observable."

This is the gait we so often see when children attempt to gallop. If right-handed, they will lead chiefly with the right arm and spring chiefly from the left leg. In horses it relieves the breathing from the stress of the "double trot," and is not so violent an exertion as the "double pace." For the same reason that the predominating use of the right hand should not be encouraged in man, no horse should be allowed to canter always with the same leading foot. The popular prejudice in favor of the right fore-foot leading arises from the fact that the resulting motion harmonizes with that of a right-handed man.

PRACTICAL SETTING-UP.

§ 51. Having in the first part gone so fully into the equalization of one S of the snake's gathering (§§ 31, 32, 33), we may refer to it for details, and shall now only attempt to give general directions, first, for a preliminary exercise with the lungs, and then for the commencement of the courses, of which it was said that, they once fairly inaugurated, the equalization will be carried through spontaneously.

There are (§ 28) four normal courses of execution in setting-up. These all consist of the same actions of absorption, releasing, and formation, but in each a different action leads, and in the middle of each the line of formation or release diagonal to the leading line enters the working.

§ 52. *Exercise with the lung-lobes.*—As described in § 46, the two lower lung-lobes go with the lower C C of the chest and with the lower or false ribs, and the two upper lobes with the upper C C and with the upper or true ribs.

In the right-handed deformity, the left lower and right upper lung-lobes are unduly expanded, while the right lower and left upper lobes are unduly contracted.

It is the full course of § 34 which we are about to follow (Figs. 7, 8, 10). 1. x. Fill the lower part of the right lower lung-lobe with air. The ribs on the concave of the fourth section turn outward. 2. *b.* Allow the compression of the upper part of the left lower lung-lobe, which will follow on the continued filling, as in 1. The spine of the convex of the third section flattens. 3. 2x. The above actions having been continued, and having proceeded far enough to bring the upper C under the influence of the lower C, the lower part of the left upper lung-lobe fills with air. The ribs of the concave of the second section turn outward. 4. 2*b*. The first movement continuing to propagate itself through 2 and 3, the air in the upper part of the right upper lobe is compressed. The spine on the convex of the first section is

flattened. 5. y. Continuing the course through 1, 2, 3, 4, so soon as the action seems to be induced fill the upper part of the left upper lobe with air. The ribs of the concave of the first section turn inward. 6. 2*a*. The air in the lower part of the right upper lobe is compressed. The spine on the convex of the second section is flattened.

Remarks.—The upper C being that in which the influence of the posterior line predominates, although 1 still continues to lead, 5 and 6 are to be the most especially developed in relation to 7 and 8, as 1 and 2 were in relation to 3 and 4. 7. 2y. The upper part of the right lower lobe fills with air. The ribs of the concave third section turn inward. 8. *a*. The lower part of the left lower lung-lobe is compressed. The spine of the convex in the fourth section is flattened.

After 4 it will be found, we think, that the other actions, including the completing double actions mentioned in § 34, occur spontaneously, and they would do so from 2 were it not that the limb action interferes. How this is to be provided for will be described farther on.

General Remarks.—First. By these actions the right lower and the left upper lung-lobes are each being filled by their upper and lower parts; but in the middle of each a portion is left which will be so filled as to make the expansion of the lung homogeneous throughout only when the concaves are fully straightened,—a conclusion which is gradually approached as the actions proceed. Second. A similar remark applies to the compressing of the right upper and left lower lobes. Third. The last action is to straighten the concave on the right, where the movement began. This is done by the double turning on the posterior lines (§ 34).

§ 53. *Course of equalization, from the left anterior, right posterior gathering, the new (right) anterior line leading.*

The chin must be kept up and the neck stretched forward. 1. x. The left inner eye muscle, beginning at its attachment to the eyeball, turns outward (§ 36), and carries with its motion the filling of the right lower lung-lobe in the fourth section. The movement then extends to the ribs of the concave fourth section, turning them outward; to the right head-ball, it turning backward and inward; to the right thigh, turning it outward; to the right jaw articulation, putting the condyle on its outer bearing (§ 44), and carrying it somewhat forward and inward. 2. *b*. The right inner eye muscle, beginning at its posterior attachment, turns inward, and carries with its motion the condensing of the left lower lung in the third section. The movement then extends to the spine, flattening it on the convex of the third section; to the left front socket quarter, which, reversing outward and backward, relaxes its upward pressure; to the right arm, which gives off inner bearing. 3. 2x. A *repetition* of 1 carries its action into the upper C, fills the left upper lung-lobe in the second section, turns the ribs outward, and increases the condyle and right jaw articulation motions of 1. 4. 2*b*. A repe-

tition of 2 carries its action into the upper C, condenses the right upper lung-lobe in the first section, flattens the spine, and increases the left socket and right shoulder-joint actions. 5. y. The left inner eye muscle, beginning at its posterior attachment, turns inward, and carries with its motion the filling of the left upper lung-lobe in the first section. The movement then extends to the ribs of the first section concave, turning them inward; to the right front quarter of the head-socket, it turning inward and forward and pressing upward; to the left shoulder-joint, which moves forward and inward. The left sterno-mastoid turns slightly inward at the upper end. 6. *a.* The right inner eye muscle, beginning at its front attachment, turns inward, reversing the old anterior gathering, and carrying with its motion the condensing of the left lower lung-lobe in the fourth section. The movement then extends to the spine, flattening it on the convex of the first section; to the left head-ball, which reverses, moving forward and outward, but without much rotation, for this is suppressed with the suppression of the lateral shapes; to the left lower jaw articulation, which gives off inner bearing, relaxing its "set" on the outer side. The right sterno-mastoid turns somewhat outward at its lower end, but this is more marked in 2*a*. 7. 2y. A repetition of 5 carries its actions into the lower C, fills the right lower lung in the third section, turns the ribs inward, increases the right head-socket movement and the action on the left shoulder-joint. 8. 2*a*. A repetition of 6 carries its action into the lower C, condenses the left lower lung-lobe in the third section, flattens the spine on the convex of the third section, increases the reversing of the left head-ball and the action at the left jaw articulation. Finally, with the giving off of inner bearing by the left hip and leg, the right sterno-mastoid turns well outward at its lower end, straightening out the right lower C, carrying the point of junction of the two C C to the right, and causing a sensible drawing upward of the right upper corner of the sternum.

It will not be necessary to go into the cross-joint movements, they come on spontaneously by continuing the filling of the right lower lung-lobe, in the fourth section, with which the movement began; and, in doing so, bring all to the centre. We have made no mention of the digastrics, but it will be found that, by adding the action of these muscles corresponding with that of their diagonal eye muscles (§ 45) after the lower jaw movements, the working will be more complete. It may be remarked that the existence of very long slender muscles stretching from about where the digastric loops are fixed to the upper windpipe to the shoulder-blades, may confirm our theory of the co-working of the shoulder-blades and lower jaw.

Remarks.—It should be remembered throughout the foregoing that every step begins with the leading movement (x), covering the steps already taken, and drawing in the new one.

§ 54. There is a check to the commencement of the above course

with the new anterior line leading, as also to all the others, the previous removal of which will greatly facilitate their execution. Besides the obstacle to setting-up from the *general* rigidity of the one-handed deformity, a subordinate obstacle has been introduced by a superadded abnormal curvature in the neck, brought on by the necessity of restoring balance to the out-of-line axis of the trunk. In the right-handed stiffness an exaggerated *appui* on the left leg is constant, and also an exaggerated *appui* on the right arm; the latter requires that a second exaggeration of the left anterior line be made in the neck and limb-cycle carrying the head to the left in order to bring the weight of the head to balance the displaced centre. This superadded gathering interferes with the reduction in setting-up, and, although it may be stretched out by the neck, its removal by a partial separate neck and limb action is the easier method.

Now, as in equalizing all the head-ball motions, whether of gathering or in reverse, are in one direction of rotation, and all the socket motions are in one opposite direction, and as also they may supplement each other,—*i.e.*, a forward movement of the one be equivalent to a backward movement of the other,—we may introduce an extra movement in any part whatever for the removal of the check; but it will be found that, to work in smoothly with the leading line, the extra movement should be the special condyle or socket motion belonging to the line diagonal in action to the leading line,—*e.g.*, the right anterior being the leading line, the limb movement of the left posterior should remove the check, viz., the rotation forward and inward of the right socket, which carries with it the inward gathering on the left shoulder-joint. In many cases it will be found best to begin with the shoulder- or lower jaw-joint instead of the head-condyle or socket itself,—*e.g.*, in our general illustration, as given in § 53, begin with pressing the left shoulder-joint forward and to the right across the neck until it affects the right head-socket, and then commence the regular course from the left eye muscle x *b*, 2x, 2*b*, y *a*, 2y, 2*a*, etc.

If y lead the movement, then the check is to be removed by carrying the right articulation of the lower jaw forward and to the left. If *a*, then the right shoulder-joint presses forward and to the left, losing inner bearing. If *b*, then the left lower jaw articulation passes somewhat forward and inward, turning so as to give off outer bearing.

§ 55. On horseback, in progression, the best way of redressing the seat for a right-handed man is to press the left shoulder-joint continuously across the neck, forward and to the right, at the same time holding the chin up and the neck stretched forward. This will move the right head-socket so as to remove the check (§ 53), and if brought into opposition with the thigh, rolling outward, will immediately bring on x, *b*—y *a*. The pressing of the left shoulder-blade across the neck must be continued until it is taken up by the regular movement, viz.,

at y (§ 52. 5. y). So soon as the check is removed, the right lower lobe, filling in the fourth section, begins the equalization, and conducts it to the end, when the legs of the rider should be felt clinging to the horse, not by an original movement of their own, but by the drawing from the tensely filled upper and front chest. We thus have the balance-seat depending on continual *through* adjustments of the whole body and with nicely adapted and continually varying pressure of the thighs only, or of the thighs and legs, when demanded; the cross-line of pressure, between the legs, also kept perpendicular to the line of motion in the horse's body.

§ 56. It now remains to explain by our theory the process of Mons. Morquin, with the mention of which we began this article.

Referring to § 2—the formation of the two posterior lines leads—the upper part of the upper lung-lobes, and a part of the upper portion of the lower, *i.e.*, the first and third sections, are filled through the mouth; this is *b* and y in double action. Shutting the mouth, retaining the air, and pressing the front upper part of the chest forward and upward, this is *a* x, the two anterior lines in reverse action; it brings the feet on their inner bearings as outer turning is given off from the legs.

Remarks.—It is to be remembered that these actions work diagonally; that is, when the lungs first fill, the lines, from the sides of the upper chest, in their directions towards the eyes, cross each other; then the two sides of the upper chest (as they are raised upward, with the mouth shut, in the exhausting action through the nostrils) spread outward, because the diagonal crossing is now below while the air is being expelled from the fourth and second sections.

2*b*, 2y. The movement extends more downward into the lower C, and upward to the special movement of the head-sockets, the two shoulder-joints, gaining in inner bearing as they come forward across the neck. 2*a*, 2x. Affect the lower jaw articulations which join with the legs in giving off outer bearing.

The foregoing action being completely carried out, and the movement in the lower C fully joined with that of the upper C through the working of the interposed limb action. The *movement changes*, by the coming in of x, y (the formation of the anterior lines), the mouth closes spontaneously, and the continued pressing upward of the filled chest, now however by its anterior part (*i.e.*, not the sides), causes the ribs on the fourth and second sections to turn outward, on which the *air enters by the nostrils* to fill these sections. The actions *b*, y (in reverse), which might expel the air from the first and third sections through the mouth, merely cause its condensation in these upper sections, more particularly in the first. Indeed, it will be found that, the action once changed to the coming in of the air through the nostrils, the whole finishes almost by a single effort, including the bringing of the lower jaw articulations,

and, lastly, of the shoulder-blades on to their outer bearings, and the carrying of the whole to the lung centre.

We think that in this exercise the removal of the check may be accomplished in the form of double action, although taking effect only in the direction required, by developing 2*a*, 2x at the lower jaw articulations,—that is, putting them both on their outer bearings in reverse action. This may be accomplished by beginning the outer bearings and pushing them to excess. Thence the action goes to the head-condyles and *b*, y are next in the order of succession.

§ 57. When the first and third sections are thus pressed full of air, the action, being carried to the extremes of 2*b*, 2y, will, by the overdone outward bearing of the lower jaw articulations, open the mouth, and a stream of air will pass through the larynx, or voice-box, at the top of the windpipe. Since x and y, 2x, 2y, the filling of the fourth and second sections, succeed in order to 2*b*, 2y, it would seem possible that a *continuous stream of air* would be kept up by drawing in air through the nostrils to the fourth and second sections, and supplying the first and third, as they forced it out through the mouth. Two simultaneously outgoing and two incoming currents of air could probably not arrange themselves in the windpipe, but that at least one incoming and one outgoing stream may be maintained is clearly seen in the chemist's use of his blow-pipe, where by inhaling through the nostrils, and exhaling through the mouth, a current of air is kept up for an indefinite time. The question is whether this be a single diagonal or a double action. In any case, Mons. Morquin was able, by filling the chest as described, and then continuing to raise it gradually in front, to produce a remarkable volume of sound, and to protract it for a wonderfully long time. It should seem that, with this method of managing the voice, by the chest, all straining of the throat might be avoided, and not less, all straining of the vocal cords, which would then always have a full bed of air under them.

§ 58. Setting-up may also be effected in double action with each of the other leading formations. In that of *a*, x—*b*, y—*b*, y—*a*, x, the fourth and second sections would fill the first, through the nostrils, and the first and third receive their air by transferrence from them, the movements of compression simply causing condensation and the mouth not being used at all.

Setting-up for persons in whom the one-handed hindrance is not at all or but slightly developed is best conducted by double action, and Mons. Morquin's method is the most easily taught.

§ 59. We may here mention the particular courses which to us seem the best adapted for certain circumstances.

A. When in *progression*. *Marching*, walking, etc., when in progression on *horseback*, and when climbing an ascent, x, *b*—y, *a*. Correction of check, 2y.

B. For *retrogression.* For descending a hill, etc., y, *a*—x, *b*. Correction, 2x.

C. For a *standing position*, *b*, x—*a*, y. Correction, 2*a*. The same for fencing, or whenever the weight is to be brought on to the left foot.

D. For *sparring*, or whenever the weight is to be brought on to the right foot, *a*, y—*b*, x. Correction, 2*b*.

When in a *sitting posture*, the courses beginning with a reversing movement are the best, because for them no extended motion of the hips is required.

§ 60. There are certain separate exercises with the neck only, which may give an idea of the influence exerted by this portion of the frame over the whole body. We shall, after a couple of preliminaries, instance those which remove the checks to the four normal commencements of equalizing, in their order.

Supposing the neck S to be gathered as it is in the right-handed rigidity,—*i.e.*, with an upper convex to the right occupying one-third or one-quarter of its length from the head, and a lower convex to the left occupying the remainder.

1. It will be remembered that the left anterior helical line (*a*) commences at the upper end of the curve, on the left side, and winds downward, along the convexes, at first in front for the upper convex; then, crossing at the right side, in rear for the lower convex, until it reaches the left side at the lower end. Now, a reverse helical traction will begin at the *lower* end, on the left, pass along the *front* of the lower convex, and go to *rear* of the upper convex; in fact, be in the tract of what would be the new (*left*) posterior line, did concaves replace the existing convexes.

In the same way the reversing of the right posterior line (*b*) would be a drawing from the right *upper* end of the neck, in *front*, passing along the upper concave, and crossing at the left side, along the lower concave, in *rear*. In fact, be in what would be the tract of the new (right) anterior line.

2. A principle to which we, perhaps, have not alluded in this article. If a line be forced in its traction beyond its legitimate gathering, it produces its opposite,—*i.e.*, the left anterior the right anterior, the right posterior the left posterior. This is, therefore, a different thing from reversing.

3. The reversing of the lines of pressure on the left of the head-joint, by removing support, causes the head to incline laterally so as to carry the top of it to the left. The formation of the new pressure on the right causes the head to incline to the right in seeking it.

A. This being premised (see § 59), let the right posterior line be forced in the neck, and let the top of the head incline to the right, moving freely forward; the right head-socket in front will be brought in full "special" action against the condyle,—these surfaces will adjust

themselves to each other; and, in the second stage, the left shoulder-joint will be brought forward. The same motion which was recommended for securing the seat in riding, only then beginning with the second stage.

B. Let the left anterior line be forced, the head inclined as in A; the right head-ball will be brought in special action against the socket; and, in the second stage, we shall have the right lower jaw articulation carried inward on its outer bearing, etc.

C. Let the right posterior line be reversed, "beginning at the right upper end of the neck, and, with a turning motion, extending in front along the upper concave, then passing in rear along the lower concave"; the head, its top part inclining to the left, will be drawn on to the reducing left socket; and, in the second stage, the right shoulder-joint will give off inner bearing, etc.

D. Let the left anterior line be reversed in action, beginning at the left lower end of the lower convex, "passing in front for the lower C, and in rear for the upper C, to the left condyle"; the head, inclining with its top portion to the left, will be drawn on to the left condyle, its pressure reducing; and, in the second stage, the left jaw articulation giving off outer bearing, will pass inward, etc.

It might again be repeated that the appropriate parts of the limb-cycle come in between the stages of the ophidian formation,—*i.e.*, the passage from one C to the other,—and that no setting-up is complete which does not finish with a spontaneous and *very sensible* expansion of the lungs.

§ 61. The want of space excludes many details and extensions of the principles here given, among them the management of the horse by the *four "aids,"* viz.:

1. The *pressure* of the *seat-bone* of the rider.
2. The *spur*.
3. The *bit*.
4. The *pressure* of the *rein* on the side of neck.

The pressure of either seat-bone develops the anterior ophidian line of its side, and thus acts on the eye.

The spur of either side develops the posterior ophidian line of that side, and thus goes also to the eye.

The bit and the neck-pressure act on the limb-cycle; the *first* goes with the outer bearing of the jaw and of the collateral hind-leg, the *second* with the posterior bearings of the diagonal fore-legs.

Suppose a horse in the trot to be halted just as he has landed on the right fore- and left hind-foot. The drawing of the reins will, from the then position of the jaw, draw on the left side and inaugurate the opposite action in the limb-cycle,—*i.e.*, the new right anterior line (x). The application of the left spur will inaugurate the new left posterior line (y) in the ophidian cycle. The pressure of the rein on the left side

(passing the hand if necessary) will inaugurate the opposite action of the concave in the right head-socket (*y*) in the limb-cycle, and the pressure of the rider's right seat-bone will inaugurate the new right anterior line (*x*) in the ophidian cycle.

As to the rider, if by the principles of setting-up he obtain a perfectly equalized seat in the saddle, he has then only to initiate in his own body those movements which he desires his horse to execute, and the aids will apply themselves.

This, of course, only holds good for the time that his body preserves its equalization; but as, by a frequent repetition of setting-up, the muscles recover their proper reciprocal equality of strength, perfect proportion in action will become the habit of the body.

Few exercises—excepting, perhaps, running, on proper principles—can compare with riding, when, *sitting close*, every movement opens the upper lungs. Few, perhaps, are less advantageous, when *original* clinging by the knees or legs secures the rider to the horse.

WM. P. WAINWRIGHT.

STYLE IN THE NAVY.

It is a common thing, nowadays, to hear officers of the old navy, in speaking of officers of the young navy, give as their opinion, accompanied by a grin, a sneer, or a scowl, according to temperament, that "they put on altogether too much style." Now, as the officers of the old navy (only a discriminating Providence or a young commander knows where the line is drawn between the old and the new) would not say anything not strictly true,—for young men in those days were trained in honor as they are to-day in pure mathematics,—we have as an axiom the melancholy statement that "Officers of the young navy put on too much style." That this is a crying evil follows naturally, not only from the gloomy manner of its assertion and the frequency of its repetition, but from the presence of that significant "too much."

In this age of progress and search for the truth, animated by a strong and, I trust, praiseworthy desire to avoid further shocks to the tender sensibilities of those we are taught from our youth to regard as our models, I boldly call upon my brothers of the young navy to assist me in my investigations, which are begun with a view to eventually suppressing the wide-spread and pernicious indulgence in "putting on style."

A subject of so grave an import should be considered thoroughly, exhaustively, and *ab initio*.

Webster defines style as *manner, form;* but as there would appear to be no objection whatever to an officer's assuming (if he have it not) an agreeable *manner*, possessing too much *method* (see definition of *manner*), cultivating a proper *way of performing or executing* his duties, following *custom or habitual practice*, or paying too much attention to *forms* (of ceremony), it must be in his putting on a *mien*, a *cast of look*, a *mode*, or putting on *a way* of *service* or *worship*,—chiefly service, perhaps. However, on the general principle *humanum est errare*, it must be conceded that even officers of the old navy have at times been guilty of such wretched fashions as these, so we must endeavor to evolve from our inner consciousness some more fitting definition for the objectionable article in question. It must be an outgrowth of the present period. Fruitful as it is in science, discovery, and general enlightenment, it would appear strange if, amid so much good, some detrimental

ideas should not take root, expand, and eventually become established institutions. "Putting on style" must be something of this sort. General usage among officers of the old navy has raised it above the ranks of slang, where it possibly had its origin.

To put on seems to mean to assume, to affect, in the sense employed. Style refers to what is fashionable in habits, customs, costumes, etc., among the *haut ton* or *demi-monde*. We speak of a stylish bonnet, a stylish coat, a stylish woman, or a stylish man.

Hawthorne tells us that the most graceful way a man can adopt of showing that he is growing old, thus preventing approaches to undue familiarity on the part of young men, is to adhere to the fashion of dress that is in vogue at the time he makes the discovery.

This would imply that if a man is not growing old, he should follow the custom of the times in matters of dress. Certainly, if a gentleman must follow a fashion in the cut or material of his garments, he should follow that of the people with whom he associates, unless he desire to appear eccentric.

If he possess good taste, he makes a suitable selection; otherwise, he leaves it to the judgment of his tailor; and if the latter be a competent person, in either case he appears dressed in the prevailing fashion among gentlemen. This excites no remark from the people with whom he is brought in daily contact. Of course, under some circumstances it would be otherwise. For example, he may have spent his youth in some remote town, and returning thither after several years of absence thus clothed, there would be a general remark that he was "putting on style."

This may appear irrelevant; but take the case of a naval officer. His associates are supposed to be gentlemen. He cannot adopt any peculiar mode of dress, such as poets or artists sometimes affect, and on shore he does not habitually wear his uniform. He might, it is true, have his trousers cut very broad at the bottom and constructed with a "fly," but it might excite a laugh at his expense, and perhaps this would sometimes mortify him.

It seems there is absolutely nothing for him to do but wear such clothes as gentlemen wear ashore; and if his garments fit him well and he is appropriately dressed for all occasions, he becomes at once an object of suspicion to some of the old navy with whom he may have official relations. Why should he dress better than his fellows? How can he know how to reef topsails properly, or determine which way a cyclone is traveling, and the bearing and distance of its centre, and how to handle his ship?

He puts on style. That is sufficient to damn him, and the service is going to the devil!

By this time it must be almost there, for it has been moving in that direction for many years.

We may now discuss the case of another representative of the young navy, who has traveled extensively, gleaning professional knowledge in all parts of the world and from all sources. In a moment of ill-advised zeal he promulgates the heretical doctrine that, compared with other navies, we are far behind the times.

He even goes so far as to adopt, while executive-officer of some large ship, certain methods and practices that he has known to add to the contentment, well-being, and efficiency of the crew in some other navy. Perhaps he recklessly abolishes certain time-honored customs of our own that he considers useless! The commanding officer allows this, either because he has caught the contagion of the age and is cursed with a tendency towards liberal ideas and would like to try the experiment, or else he is too indolent not to be charmed at having a go-ahead executive who will take matters into his own hands and save him a world of trouble.

The watch-, quarter-, and station-bills are altered on this new basis, and to suit the special requirements of the ship an entirely original fire-bill is made out. Friday is selected for clearing ship for action, and general quarters, instead of the traditional Monday, simply because Saturday is the natural "field day"; and he sees no reason why the ship should be torn to pieces on the first day of the week. Saturday is sacred to the men after the holystoning and general scrubbing. The utmost care is exercised in the *details* of the drills. The best approved organization for the battalion is adopted. Every working day of the week, when lying off a suitable place (and very few places are unsuitable), parties of men are sent ashore to the rifle-range, improvised or otherwise, for practice with rifles or pistols. No matter if only half a dozen can be spared; they go.

They become good marksmen, and are thus taught what singularly few enlisted men in the navy know anything about, how to handle fire-arms intelligently.

In this way he avoids that bugbear of the quarter,—target practice. There is no postponement until the arrival of some convenient (?) day near the end of the quarter, when everybody is driven nearly to distraction with great guns in the morning and small-arms in the afternoon; the executive-officer hurrying up the divisional officers: "Let the men blaze away, no matter whether they hit the target or not. We must get through this afternoon. I want to paint ship to-morrow." And hundreds, nay, thousands of cartridges are fired in the air! The regulations require that so many are to be expended each quarter. They might as well be pitched overboard, and the gunner's gang saved a lot of trouble. Suitable outfits are provided for the men for landing under arms, and when they go they are prepared to meet an opposing armed force even at the beach. They are not for show, but to meet an enemy.

And yet to see them marching to the drill-ground is a handsome sight. They are thoroughly neat, and their uniform is perfect from their white leggings to their cap covers. A strong, healthy, hardy, well-fed, cheerful-looking set of men, handling their pieces as familiarly as the marines, conscious that they are always going to do the proper thing, proud of their ship, their officers, and themselves, they swing with a rapid, tireless step over the ground, and you ask yourself, "Who could I have to equal these in time of need?"

Soon the adjacent hill is covered with lines of skirmishers. There is attack and defense, rally and retreat, defeat and victory. They are playing at war, but it is not idle sport. They are learning the lesson of life and death; and when they feel the sting of the bullet or the grating of cold steel the lesson is learned. Drills are preparations for possible contingencies that may arise. If conscientiously and intelligently carried out, the emergency is promptly met.

The conduct of the men is scrupulously noted, and every privilege allowed by the regulations is liberally awarded. The men know just where they stand. They feel at once that good conduct is at a premium.

They draw as much money as they choose, keeping only the small balance required on the books; for the executive is allowed to ventilate his idea in this matter, and he does not consider it is justice to Jackie to keep him stinted all the cruise in order that he may have several hundred dollars at the end of it to turn over to sailor boarding-house keepers during his few weeks on shore after he is paid off.

In port, after the duties of the day are done, such of the first-class conduct men as choose go ashore, to return early next morning, provided, of course, half the ship's company remain on board. The more men become familiar with liberty the more they prize it, and drunkenness and overstaying leave become the great exception, not the rule. That most demoralizing of all events in a man-of-war, general liberty, with all its disgusting spectacles, is a thing unknown.

In a cruise around the world such men see as much of it as the majority of the officers, and the people in foreign lands look on these handsomely dressed, fine-looking, well-behaved sailors and make their own comments.

The ways are innumerable in which this man works for the good of the ship and of the service. His influence extends to the officers as well. It is one of his ideas that because a lot of officers are ordered to a ship and compelled by the regulations to live together, there is no reason why the mess should be a rowdy institution; and it must be admitted, with a blush, that through easily explained causes the general tendency is in that direction.

The pressure of gentility always has its influence.

We have considered this executive-officer as a gentleman and one of purpose. By law and custom he is presiding officer of the mess. The

formation of the character of a new mess is an operation that requires time and care and judgment. A fair endeavor is at once begun, the pressure is firmly maintained, and the courteous, dignified, genteel element prevails. The mess buffoon, whose wit is generally "dry," and always coarse, invariably has at the beginning a large following. Gradually he ceases to be an oracle, he is deserted, and law and order and decency prevail.

We may suppose now that a year of the cruise has passed. The subject of this hasty sketch surveys with a feeling of well-earned satisfaction the result of his labors. The men are happy, healthy, and thoroughly drilled in all their duties. When the officers found this man to be capable and in earnest, they gave him their heartiest support. They have cheerfully worked harder than they had ever thought of doing before, and are rewarded by a knowledge of the completeness of the efficiency of their ship, and the harmony and refinement of their mess. Every one looks forward now to a comparative rest. The ship is in working order. The taut rein will be slackened, but never cast aside. The captain is suddenly ordered home, and his successor arrives. However, every one feels that he must be glad to take a ship where everything is running so smoothly. Here they make a mistake. Captain Titleaice has his own ideas, and does not like to have people put on style aboard *his* ship. He begins his reforms at once.

He spies the 11-inch gun, which has been converted into an 8-inch rifle. The former captain had carried out one of the darling wishes of his heart and had it bronzed. This was a tedious piece of work, requiring great care and patience, but finally it was satisfactorily accomplished. It certainly looked handsome; and the crew of that particular gun were very proud of it. "Have that gun blacked at once, sir." "Ay, ay, sir," answered the executive-officer. The old quarter-gunner, whose heart is wrapped up in this, his darling, drops the swab from his hands, looks aghast, and, turning away, brushes something like a tear from his furrowed cheek—bronzed as the gun. "Altogether too much style," the captain mutters.

"When can you go to sea, Mr. Nera?"

"To-night, sir, if necessary; or, if you choose to get any mess-stores on board, to-morrow morning."

"Have the ship under sailing orders to-night at sundown. Give orders to have steam at four; we will go to sea at six in the morning."

At 6 A.M. the following day the executive-officer reports to the captain the chain is at a short-stay, and everything ready for sea. The captain is astounded. He has been up since five, fretting and fuming over his coffee, and wondering if this ship is never going to wake up. He did think he heard the click of the pauls on the capstan, but he waited for more familiar sounds. He marches out to the quarter-deck, climbs on to the bridge, where he finds the executive-officer and nav-

igator, returns their pleasant salutation with a nod, and says to Mr. Nera, "I don't see the rest of the officers. Are they in the habit of taking so long to get on deck?"

"We have not been in the habit of calling the officers when we get under way or come to anchor under steam, sir. There is nothing for them to do."

"Send for them, sir, at once, and let them take their stations! I never heard of such a thing! (Too much style for *me!*) I suppose, sir," very sarcastically, "you don't call the officers when you wish to reef topsails?"

"No, sir; very rarely. We have a fine crew, and the officer of the deck reefs topsails with the watch very handily at night. During the day I sometimes take the deck and make an exercise of it."

"Well, sir, in future, whenever any similar evolution is to be performed, or in sending up and down to'gallant and royal yards, etc., you will take the deck yourself, and see that all the officers are at their stations, and in their frock-coats, too, sir, not in these soldier-clothes (blouses)!"

Sotto voce, "By heaven, this style will be the death of me yet! Aloud, "Who did I hear you tell the messenger-boy *not* to call?"

"The officers who had the mid-watch, sir."

"I gave you no such instructions, sir. I directed you to have them all up here at their stations! Be good enough to obey my orders; and, by the way, sir, have you no midshipmen on deck, or are you afraid of disturbing them also?"

"There is a midshipman in the gangway, sir. He was officer of the forecastle. When I relieved the officer of the deck, he took the forecastle, relieving the midshipman there."

"I am surprised, sir, that you should send a messenger-boy to call officers when you have midshipmen,—perfectly surprised, sir! Never do anything of the sort again, sir! Midshipmen must be put to their proper uses. The idea of sending a messenger-boy into the ward-room, and everybody asleep there, too!" And walking to the other side of the bridge, he mutters, "Altogether too much style for *me!*" and determines to crush it.

Once fairly launched on the sea of reformation he makes rapid headway. Abuse after abuse is corrected, and he soon feels the comfortable assurance that style is going to the wall. It would be useless to endeavor to enter into the details of his reforms; it would be far beyond the scope of a limited article. He lives in an atmosphere of surprise. He found that it had been the custom to fit clothes-lines at sea forward, when under steam, from the fore yard-arms to the bowsprit-cap. It was explained that this was on account of the smoke coming aft so frequently and soiling the newly-washed clothes, often ruining them. But the captain's pertinent comment had been, "Who ever

heard of such a thing?" and the lines forward were done away with.

The men looked very nice, certainly, in their neat working-suits; each man had two, and they were worn altogether at sea; but the captain explained to the executive-officer that these suits were only intended to be worn on such occasions as tarring-down and coaling ship, not to encourage idleness and make dandies out of the men,—this last remark being called forth by the executive-officer's explanation that it saved the men's clothes, etc. ("Style, style, style!")

A few days after the arrival in port, the captain asked the executive-officer what he meant by bringing in another liberty-list for approval.

"You told me to give the men liberty, sir."

"Very true, sir; but I've already signed two liberty-lists. Both watches have been ashore, haven't they?"

"They don't go by watches, sir. These are first-class conduct men. They go ashore whenever their services can be spared; generally speaking, as soon as the afternoon drills are over."

"Pray how long do you continue that, sir?"

"As long as we are in port, sir, unless there should be some dangerous sickness in the town, or some such reason."

"Very well, sir. A better reason than that exists. I don't approve of it! I'm not going to have my men running ashore all the time. The wonder is there's a *semblance* of discipline in the ship. Hereafter you may let the first-class conduct men go ashore once a fortnight."

"But, Captain Titleaice, the regulations——"

"Permit me to interpret the regulations for myself, sir. You understand my orders." And he mutters to himself, "Style, style! nothing but style!"

But in spite of the magnitude of the task he has undertaken the work of reformation goes bravely on. He is shocked at seeing nearly half the men at general muster wearing a sort of a medal.

"What is this idea, Mr. Nera?" he asks.

"Those are good-conduct badges, sir. The men who have them wear them at general muster, and on all occasions of ceremony."

"This must be stopped, sir. I can't tolerate that amount of style. *I* will direct in future when they are to be worn."

"But, sir, the regulations——"

"Mr. Nera! I consider this constant tendency on your part to weaken my authority as positively insubordinate. I warn you now, sir, never to attempt again to instruct me in the regulations. I know them, sir! I know them by heart, and no such infernal foppishness as this is intended, no matter what they may say!"

For the remainder of the cruise the badges earned by good conduct in a former enlistment, and to earn which all the men not happy possessors have been striving, are only seen on Sundays, when they are taken

from their little cases, carefully wiped, and then stowed away for another week.

The captain had noticed, too, that boats were sent from the ship in charge of the coxswains. "No midshipman in the boat! How's that, Mr. Nera?"

"We've had no necessity for sending officers in charge of boats, sir, except on special occasions. The coxswains are perfectly reliable men; always manage their boats well, under oars or sail, and take a great interest in them."

"I never heard of such a careless piece of business! The wonder is that the whole ship's company hasn't run away! Hereafter, sir, always send an officer in charge of boats leaving the ship, for *whatever purpose.*" And then came the moan, "Style, style, style,—nothing but style!"

Then some of the officers wanted to keep their lights burning after 10 P.M., but Captain Titleaice had no idea of having his ship set on fire for the gratification of a mere whim, so this was promptly denied; and word was sent to the executive to inform all the officers that such unreasonable requests would not receive a hearing from the commanding officer in future.

The landing-parties and rifle-range were abolished. It might be the new style to turn sailors into soldiers, but Captain Titleaice had no idea of having *his* men spoiled, and for somewhat the same reason the school for the apprentices (two hours daily, except Saturdays and Sundays, under charge of the midshipmen) was stopped because Captain Titleaice saw plainly that they'd soon learn so much they'd leave the service, and he wasn't going to have *his* ship turned into a school. "I propose to have a man-of-war, sir, without any of this style!" emphatically remarked this gentleman, and he had it.

Mr. Nera was court-martialed after six months of the new administration for disrespect to his superior officer, and sentenced "*to be dismissed from the station.*" Lieutenant-Commander Surefoot, the navigator, took his place; but through influence at home was relieved before he had any trouble. Two other officers were ordered as executive. One, Lieutenant-Commander Storms, the captain had detached because he thought him crazy; and the other, Luffentakit, finished the cruise. The other officers brought all their forces to bear to bring about their detachments, and the majority succeeded.

New ones took their places. The men finding themselves cooped up on board ship and deprived of nearly all privileges, began to run. Courts-martial became the order of the day. Both officers and men grew slouchy in their dress. Just so much drill was carried on as was absolutely necessary.

The captain did not approve of white in the tropics, "Never looks well, you know;" so the officer of the deck, as a special mark of con-

descension, was permitted to wear a *flannel sack-coat*. "These white blouses may be all very fine," he had said after a visit to the flag-ship, "but they ain't regulation, and never will be. The admiral may *allow* them to be worn, if all the officers get them (and I see they have), but he can't *order* them, and I don't propose to have the officers in *my* ship put on any such style."

I was visiting an old shipmate in Norfolk when the "Hiawatha" came in from her long cruise. Gray had some small business matter to attend to on board, and asked me to accompany him.

Gray sent his card up to the executive-officer, and we were invited over a dirty gangway on to a dirty deck, and down to the ward-room.

At the head of the ward-room ladder Joly Jobson met us, and grasped both Gray's hands in his with his honest, hearty greeting. "And how are you getting on, Joly?" asked Gray, kindly.

"Oh, Gray," the poor fellow answered, very mournfully, "you were a lucky man to get out of her when you did! I don't believe a man could have been happier than I was the first year of this cruise. The last two years have been just hell. Everything went wrong. We haven't one-half the old crew on board, and I am the only officer in the ward-room that went out in her. You can't imagine how lonesome I've been. All the rules we laid down for the government of the mess have been abolished. Just look down the hatch here." And we took a peep into the ward-room which had once been the quarters of a lot of men that "put on style." The dingy paint-work was in keeping with the broken chairs, the worn-out oil-cloth, and dirty mats placed at the doors. Several spittoons of huge proportions and abundant signs of usefulness were scattered about, and near them numerous marks of defective marksmanship adorned the floor and bulkheads.

Several officers were lounging about in their shirt-sleeves, and one, spread out on the mess-table, was saying something funny to the servant who was trying to oust him that he might lay a very much soiled cloth for dinner. A greasy barber-chair was in close proximity to the table, and one of the officers was having his hair cut.

"I don't think I'll go below, Joly," said Gray, after a hasty glance. "It doesn't smell very sweet. You come and dine with us, and we'll talk over old times. I see there have been some changes."

And as we waited in the gangway for a moment for our boat to be got ready, I heard the captain say to a visitor, "Here have I been for two years getting this ship into shape, and just as I've succeeded the cruise is up, and we part company. It's one constant fight against style." And, with a long sigh, he added, "Who will command these ships when we are gone?"

A Lieutenant U.S.N.

THE NEW WOVEN CARTRIDGE-BELT.

As the new woven cartridge-belt, recommended by the equipment board of 1878–79, approved by the general of the army, and adopted by the Secretary of War in General Orders No. 76, of 1879, will be issued to the army during the coming spring and summer (the chief of ordnance having purchased forty thousand of them for issue), a brief description of its character, uses, and treatment may prove interesting and useful.

The belt in its main features is not unlike what has been for a long time known as the "prairie belt," its distinguishing characteristic being that it is not only made entirely of heavy cotton fabric, but that the whole belt—the main fabric or body of the belt, as well as the loops or thimbles which hold the cartridges—are woven in one solid piece, at one and the same time, in the same loom, there being no sewing whatever in the entire belt. (See cut, Fig. 1.) The cylindrical loops are

FIG. 1.

Pat. Aug. 20, 1867; July 1, 1877, and Dec. 28, 1880.

taken from and returned to the main web at the same point, so the cartridge is held in place by friction produced by contact with its whole circumference; the loops are also, as a rule, made long enough to cover the entire brass stem of the shells and about one-sixteenth of an inch of their protruding leaden balls, in order to prevent the accumulation of fine sand or other hard substances in the joint between the lead and brass, which is the more likely to adhere in warm climates from the usual exuding of the lubricant, thus causing the shell to gum and fail to extract, and, perhaps, injuring the rifling of the gun-barrel.

The main fabric or web of this belt is a heavy double one, laced together with a small portion of the warp, called by weavers "binders," the fabric being similar to what is known as "back-banding," pro-

ducing, when the binders are not in use, a hollow or tubular fabric used for making hydraulic hose; for one-fourth of an inch on each selvedge these binders are left out and the cavity filled with extra threads, producing a corded selvedge, the upper one serving to rest over the flange of the head of the cartridge and prevent its falling out. These corded selvedges are colored to match the pipings and trimmings of each corps or arm of the service, the main belt being of a mouse-colored gray. The belts, being three inches broad, allow the cords to project beyond the ends of the cartridges, thus preventing them from soiling or abrading the clothing, and at the same time giving greater effect to the colors; unfortunately, however, some twenty thousand of these belts were woven in plain drab before the colors were adopted by the War Department.

For the army service cartridge two sizes are made, one with forty-five loops, occupying twenty-eight inches on the belt, the other with fifty loops, occupying thirty-one inches, with billets six inches long at each end.

The buckle is a large, pressed brass one, so constructed that the belt can be adjusted at either end, and thus keep the buckle equidistant from the cartridges on either side, preserving a neater and more symmetrical appearance.

The belt weighs but eight ounces, and the belt and buckle complete weigh but eleven ounces.

The cut, Fig. 2, represents the inventor's design as to the best method of wearing the belt. Ordinarily but one belt should be worn, and that around the body, but for rest it may be changed over either shoulder, as in the figure.

The cartridges are taken from the belt as a lady puts her needle through the cloth, with the middle finger, and takes it away with the thumb and forefinger, as seen in the cut, the belt being turned on the body as the cartridges are exhausted.

In cases of extraordinary emergency the soldier may carry two belts, one around the body and one over the shoulder; but these extra belts will be habitually folded and packed, filled with cartridges, in strong canvas bags or boxes, and transported in wagons or on pack-mules, and only issued to the men on the eve of battle or other emergency, which, having passed, they may be returned for transportation to the wagons or mules.

These belts can be readily washed with a brush when they become soiled, but they should invariably be both washed and dried with the cartridges in the loops, in order to preserve their form, and should they become wet when empty, they should be filled before drying.

When the fabric comes from the loom, the extraordinary tension required (over eight hundred pounds) distorts the threads from their natural position, and it assumes a harsh and rough appearance, as though

stiffly ironed, rendering it necessary to finish it by first filling the loops with formers (empty shells), then plunging it in boiling water, and drying with the formers in the loops. When wet, the loops are slightly smaller, but still the cartridges can be readily withdrawn; when dry they are uniformly of the same size.

FIG. 2.

In the end of each billet are inserted four large metal eyelets, by a machine specially invented for that purpose, which does not cut the threads of the fabric, and when it is desired to wear the belt over the shoulder the ends are laced together with a strong string.

On the lower edge of the belt, on each side, over the hip of the

wearer, are also inserted five or six eyelets, one in each space between thimbles, for the purpose of lacing the bayonet, pistol, or knife-scabbard, or for carrying game, tobacco-bags, or other small articles. In case of the scabbards they are cut square off, flush with the edge of the belt, and a corresponding number of eyelets placed near the edge, when they are laced like the ends of the billets.

For pistol-cartridges for cavalry it is designed to lace in a similar manner a small piece of the looped fabric, about five inches long, carrying nine cartridges, to the lower edge of the belt on each side of the buckle.

This method of carrying cartridges has been universally adopted by the frontiersmen of this country, and it is confidently believed that the woven belt will prove superior and more satisfactory in every respect than any of the various patterns heretofore used, and that it will at no very distant day become the universal method of even the slow-moving, methodical armies of the civilized world.

The one serious objection heretofore has been its plain, unprepossessing appearance, but this will now be overcome by the fine, showy display produced by the elegant buckle and the attractive colored selvedges, making a gay appearance even at dress-parade.

Its superior practical qualities over all other known methods are too apparent to need any general description here, but among them may be named the *easy access*, the *ready inspection*, the *instant detection of loss or exhaustion*, the *expressive martial purpose at sight*, important in the suppression of riots, the *great comparative ease with which it is carried*, fitting closely to the soldier almost "like the bark to a tree," and being so widely and equally distributed as to lead him to feel almost that it is a part of his person; the *economy in weight and expense*, the cost and weight being little or no more than the belt to which the box, pouches, etc., of other methods are attached. It is soft, pliable, and homogeneous in texture with the soldier's clothing and other accoutrements, and to any one whose judgment is not biased with that fixedness of ideas which comes from association with long-continuous custom, it is *more attractive*, *neater*, and gives the wearer a more *soldierly appearance* than the box or pouch.

It is not by any means assumed that this belt is perfect; no doubt improvements will be made upon it, and especially is it probable that in the manufacture of an article so essentially radical and novel, some mistakes may be made or defects appear: for instance, in the size of the loops, which are in each belt as nearly alike as two pins, and are supposed to be just right, yet nothing short of actual test in the service can determine whether they may not be a little too large or a little too small; and also in the buckle in endeavoring to make it as light as possible, it may prove to be too weak at some particular point, which cannot be determined without actual tests. Should, however, anything of

this nature develop itself, it can be corrected in the next to be manufactured, and it is with a view to suggestions of this nature that this paper is written.

The writer has been, for the past four years, engaged in perfecting a power-loom to weave this fabric, and has now at Worcester, Massachusetts, ten perfectly automatic looms, capable of adjustment, so as to weave any sized loop, and any width and length of belt, producing twenty belts per loom each day. Some idea of their complex character may be formed when it is stated that they have two thousand independent parts, and cost about one thousand dollars each.

An investigation into the ancient methods of carrying ammunition will again illustrate how little of the contrivances of men of any age are truly original and novel. The primitive methods, from the invention of fire-arms until the wars of Frederick the Great, were very similar to that now introduced, in fact, as nearly as was possible, consistent with the difference in the cartridges of the two periods. The powder was done up in papers in separate loads called cartridges, which were tied on strings and carried around the soldiers' necks, or put in separate metal pockets with bottoms, and close-fitting tops, on the belt or attached to the clothing, and this method has been continuous among the East Indians.

The destructible and perishable character of these cartridges, when exposed to rough usage, inclement weather, or a moist atmosphere, rendered this method very unsatisfactory, when armies with fire-arms came to be organized in great numbers, and to march with certainty regardless of weather. The great genius of Frederick saw the necessity of some method for keeping his "powder dry," so he invented the cartridge-box, which has become fixed in the popular mind of the whole world as one of *the* distinctive marks of a soldier; and the pertinacity with which the professional soldier of to-day clings to the box leads us readily to imagine with what disgust the one of King Frederick received the order to abandon his traditional and life-long method, with the exposed billets so suggestive of his calling, and lash to one of the protuberances of his body a thing so cumbersome and at the same time as unsightly and unsuggestive of anything martial as "a bump on a log," not having even the advantage of the ancient proverbial method of carrying corn to the mill with "a stone in the other end of the bag" for a compensating balance.

In 1866, on the introduction of metallic ammunition, comparatively non-perishable and indestructible, the writer, conceiving the idea that the almost cylindrical form of the stem of the cartridge with the projecting flange on its head had rendered it possible to make a belt with close-fitting cylindrical loops, the cartridge to be held in its place by friction and prevented from dropping through by the flange, equipped his company, first with belts made of leather, but after several years of

trial these did not prove entirely satisfactory, by reason of the acid in the leather in action with the copper in the shell producing a verdigris, and causing the shells to stick fast in the belts; then canvas and webbing were substituted, which proved more satisfactory, although it was very difficult to make the loops of uniform size or avoid their ripping off in use. The army on the frontier gradually provided themselves with belts of this character of their own make.

In the great Sioux war of 1876, when the two armies of Generals Terry and Crook met on the Yellowstone River, with an aggregate of four thousand regular soldiers, two young officers were sent out to inspect that army, particularly with reference to arms and accoutrements, and it is related of one of them that he was not a little disappointed to find all the men carrying their ammunition in belts improvised by themselves, and made many remonstrances with the captains for permitting their men to violate the regulations in regard to equipments; at last he found a solitary sergeant with a veritable cartridge-box hung upon his belt. Calling a few officers to him with the object of illustrating the superiority of the box, and recording the sergeant's testimony in its favor, he said, "Here, my man! I see you know how to carry your ammunition; let us see your box!" The sergeant handed him the box, when lo, on opening, it was found to contain about two pounds of salt pork; the sergeant had his cartridges in his belt.

On the report of these officers, the chief of ordnance had manufactured at Watervliet Arsenal a supply of belts more perfectly made, which proved still more perfectly satisfactory.

The woven belts are now being manufactured in large quantities for all calibres, and all lengths of ball-cartridges, and for all kinds of paper shot-shells.

For metallic shot-shells they have not proved satisfactory by reason of the tendency of the load to drop out, and the difficulty of inserting the shell in the loops; experiments are now going on, however, which will, no doubt, soon overcome these difficulties.

ANSON MILLS,
Major Tenth Cavalry, Bvt. Lieut.-Col. U.S.A.

THE EXAMPLE OF WASHINGTON.

AN ADDRESS DELIVERED BEFORE THE CADETS OF THE MILITARY ACADEMY AT WEST POINT BY BREVET MAJOR-GENERAL O. O. HOWARD, U.S.A., FEBRUARY 22, 1881.

ONE hundred and forty-nine years ago to-day George Washington was born. His name is as familiar in America to every child of ten years as that of his school companion or playmate. A halo of preciousness and sanctity clusters about this name, so that among fifty millions of people within the boundaries of this country who speak, and write, and print the name, it is invariably done with a peculiar show of reverence and affection in the utterance or the statement.

There is a hidden meaning in the name of Washington, for it excites a singular, a unique interest among all the civilized nations of the earth. This preciousness, this sanctity, this reverence, this peculiar and universal interest which no other mortal name has yet attained, has for foundation, *character*.

No mere physical superiority, neither feats of strength nor suppleness of frame-work, could have produced such an accumulation of noble virtues. Neither the powers of Hercules nor of Vulcan could touch them.

No expansion of intellect, whether massive like Webster's, crafty like Jacob's, grasping like Napoleon's, or shrewd as Loyola's, has produced a similar lasting impression.

The nobility of form, manly presence, and vigor of constitution, we are thankful to say, belonged to our first general and first president.

The well-balanced mind, sound judgment, and fair culture have left their welcome record in the history of his eventful life. But oh, how like nothing would this mere scaffolding appear were there not behind it the solid structure of uprightness, genuine honesty, purity, love directed without, within, above; in brief, that wholeness of soul which the word integrity has garnered, solidified, and crystallized!

Who of us is not proud of the name of Washington? Whose heart does not go out toward him, toward his faithful and devoted mother and his well-beloved wife, and all the intimates of his boyhood and youth, with unwonted interest and singular affection? If in the years of contention we, the people of these United States, forgetful of his "line upon line" and "precept upon precept," forgetful of his warn-

ings and his self-denying example which was left to us for our admonition, have cherished and sometimes idolized other names more than his, both the worthy and unworthy, let us to-day turn back to our earliest and best hero and to the contemplation of some of those qualities which made up his character,—qualities which, if we steadily imitate and steadfastly follow, we shall each fill no mean place in history, and at least have the consciousness that somebody is happier and better because we are living in the world.

It is a good thing for a young person to learn early in life the distinction between character and reputation. Certainly one's reputation should, if possible, be good; it is important to have a fair record; a good name is better than rubies, more precious than ointment and delightsome to our friends, but how many thousands of men of grand powers and brilliant acquirements have made their reputation the object and end of existence, and have not been sufficiently careful of the means of acquiring and preserving it! They have finally, wofully failed in the keeping and enjoying the fruits of their efforts; whereas the man in search of a genuine character, the man who makes his character the object of his thought and his toil, can never really fail.

The *reputation* which one enjoys is rather what, to his companions or other men, he appears to be.

A man's *character*, in its true sense, is what he actually is.

As the branch from the vine, so the reputation should proceed from the character.

The character of every man is complex, of course, and has epochs in its growth and development.

These epochs are often very, very important. They are forks in the roadway of life,—go one way, your life grows better, stronger, and happier; go the other way, and your life becomes the worse, the weaker, and is perpetually troubled. How wise, then, to study these epochs and examine well every pathway that branches to the right and to the left!

With what interest have I observed these turning-points in my own life, and in the lives of those who were my companions here twenty years ago!

It is not my object to give an abstract homily, or a dogmatic discourse, often so wearisome to the flesh, but to put as much of my thought as possible into a concrete form. Let the mind rest upon the noble, the exalted character of Washington. I invite you first to the cradle of its formation. It was with that best gift of God, a good mother.

We enjoy Irving's reference to his early years. He says, "George, as his intellect dawned, received the rudiments of education in the best establishment for the purpose that the neighborhood afforded," . . . "an old field school-house;" humble enough in its pretensions, and kept by one of his father's tenants named Hobby. "The instruction doled out by him must have been the simplest kind,—reading, writing, and cipher-

ing, perhaps; but George had the benefit of mental and moral culture at home from an excellent father."

But shortly after this teaching his father died. George was then but ten years old.

That is about the age when a boy begins especially to need a father's discipline, and is most sensibly affected by a father's example. The father dies; it is a great loss,—I have felt it in my own life,—but thank the Lord who spared to our Washington the best of mothers. The same author remarks of her, "Endowed with plain, direct, good sense, thorough conscientiousness, and prompt decision, she governed her family strictly but kindly, exacting deference, while she inspired affection. George, being her eldest son, was thought to be her favorite, yet she never gave him undue preference, and the implicit deference exacted from him in childhood continued to be habitually observed by him to the day of her death. He inherited from her a high temper and a spirit of command, but her early precepts and example taught him to restrain and govern that temper, and to square his conduct on the exact principles of equity and justice."

These glimpses into the nursery and the home-life afford all the revelations that we need.

I. It is a West Point custom to take pupils back to first principles, to axioms.

It would be very plain, even if we did not know of the positive moral and religious teaching given by his father and mother to this child, so full of promise, that he early learned one fundamental principle of character.

It is one which the late "scientific method" reduces from a divine precept to a mere human maxim.

It is one that a Herbert Spencer would derive from cultured selfishness, delicately refined.

It is one that the infidel, who holds up to public contempt the shortcomings of his parents, has long since learned to despise.

Yet the undisputed fact of history is written in our Scriptures, "And God spake all these words." Among them in the second table we find, "Honor thy father and thy mother; that thy days may be long upon the land which the Lord, thy God, giveth thee."

These ancient words with other precepts were graven upon two tables of stone, and the same inspired authority declares, "And the tables were the work of God, and the writing was the writing of God graven upon the tables."

I know a fine appearing, manly youth of about twenty years; he is a student away from his home. A friend of his family living near his academy thus told his father:

"I heard your son say that he would not willingly do what he knew his father would disapprove." God will bless and prosper such young

men. They have a rich inheritance in the only commandment of the ten with a promise.

Washington was so studiously observant of this divine law of reverence and love toward his careful, judicious, Christian mother, that he denied himself a much coveted position, which was offered to him before he was fifteen. It was the warrant of a midshipman in the British navy. There was much entreaty by his brother and himself, many powerful friends urging it. The mother was over-persuaded and about to yield, when a letter from her brother, then in England, reawakened her former misgivings and solicitude. The mother's heart, like that of the mother of Jesus, often has prophetic impressions for the child of her love. She again made strong objection, and Washington, who in time became the man of a wonderful decision of character, yielded then to a mother's persuasions, and gave up the prospects so delightsome to his young and ardent wishes.

If he could have opened the windows of the future, and have beheld events in the order and color in which they were to appear on the stage of his life, he could not have decided better.

General George H. Thomas, who, a Southern man, had to make his most important decisions in the line of self-denial, and who above any officer in the late war of Rebellion held the abiding confidence and love of his soldiers and companions in arms, was unceasing in his devotion to this principle of loyal duty, "Children must be made to obey their parents. Obedient children will not grow up to despise and resist a proper authority." When sent to by a college authority in his district, and informed that the college boys were made restless and ungovernable by the presence of certain United States troops, and that it would be best to withdraw the offensive cause of trouble, he replied,—

"There is but one way to deal with refractory and disobedient boys. They should be properly punished." Then turning to his adjutant, he said, "Increase the troops till the bad conduct ceases."

A far better way is that inaugurated by Washington, namely, Honor thy mother, and yield her obedience, because it is right so to do. It is the law of God written in the book and on the heart.

II. A second principle of character is contained in the words, "Her (Mrs. Washington's) early precepts and example taught him to restrain and govern that temper,"—that "high temper and spirit of command" which he had inherited.

How prone is a man, who has a high temper, to yield to a sudden impulse, and contravene the best purposes and plans of his life! This temper unrestrained, like an unchained tiger, usually leads to dire calamities, terrible destruction, and sudden death.

Where is there described a brighter specimen of noble manhood than the ancient king who stood head and shoulders above his comrades? Yet the power of an ungovernable temper threw Saul from the

pedestal of his glory, and has left for him an ignominious record of injustice, failure, unsurpassed misery, and, finally and fittingly, self-destruction.

Charles the Twelfth of Sweden, who for a time shone like a meteor, lacked the self-control that his country needed. His boldness, quickness, and genius gave him extraordinary victories, and left to his great enemy a disastrous defeat; yet the victory and self-confidence of Charles were but the beginning of the end. The meteor, remembered only for its brilliancy, disappeared as suddenly as it came; while Peter the Great, the enemy and rival, profited more by defeat than by victory, for he brought under restraint his own fiery temper, and forced himself to labor and to wait till he obtained a triumph and reaped its abundant fruits.

Of Washington, in a higher and better sense, with a soul under self-control because loyal to duty and to God, no adverse circumstances, no suffering of his soldiers, no unexpected defeats, and no treachery of supposed friends, ever so disturbed that high temper, till, like a noble war-steed under rein, it carried him safely and successfully through all the battle-fields of his wonderful career.

III. A third element of character is plainly deducible from the mother's early teaching, and enforcing that teaching by her own example, viz., that of "the exact principles of equity and justice."

This *equity* and *justice* constitute the righteousness of the Bible. In the French Testament the word which we translate *justice* is always used for our term righteousness. There is a good old word that I used to hear in my boyhood which perhaps better expresses the thought,—RECTITUDE. One of our old professors here, amid the other honest workers with whom I served, whose face I miss on my return to the Academy, because he has gone to his reward,—the reward of the good and faithful public servant,—especially comes to my mind in this connection. I mean Professor Albert E. Church, our professor in mathematics. Rectitude was stamped on his forehead. In his heart and in his life the scales of justice appeared delicately poised.

It is one thing to love justice and quite a different thing to do justice. To do justice needs clearness of moral vision, a developed faculty of penetration, and what comes by the repeated acts of uprightness,—a habit of justice. Among numerous other graduates Meade, Thomas, McPherson, and Sedgwick occur to me as eminently just men. They each possessed and exhibited a rectitude of purpose and life, and showed such a facility for making upright decisions that few men were found who would appeal from their judgments.

By the study of such lives now familiar to us, the lives of these men whose monuments adorn our public squares, and give interest to our academic grounds, we can bring into closer observation and sympathy the uprightness in the life of Washington. We can rejoice that

his noble mother held him so steadily to the practice of just dealing in his early youth, in that formative period, so that he ever after the more easily conformed to the claims of duty.

There is no other institution in this land besides ours where the officers and pupils take upon themselves so solemn and imperative obligations to be just and to do justice. No mere espionage will answer. The sense of rightness must be in our own individual hearts. "As a man thinketh in his heart, so is he." No mere eye service will make uprightness of mind.

A right regulation is for the good of the Academy, the army, the service. It is established in justice for the benefit of all who come under its operation.

Had Washington, possessing the character that he had, been a cadet here, he would have said to himself, "The regulation is to be kept, and I will do my best to keep it."

Had he been an officer, he would have said, "The regulation is to be enforced, and my duty is to contribute to its enforcement."

IV. Another element of Washington's character to be traced to the earliest years, perhaps inherited from both parents, is a *constancy of purpose.*

"Carlyle once asked an Edinburgh student, who tells the story, what he was studying for. The youth replied that he had not quite made up his mind. There was a sudden lightning flash of the old Scotchman's eye, a sudden pulling down of the shaggy eyebrows, and the stern face grew sterner as he said, 'The man without a purpose is like a ship without a rudder; a waif, a nothing, a no man. Have a purpose in life, if it is only to kill and divide and sell oxen well, but have a purpose, and having it, throw such strength of mind and muscle into your work as God has given you.'"

Daniel, as a child, purposed in his heart that he would not eat of the king's meat, forbidden to his people, nor drink of the king's wine. He purposed in his soul to call upon his God for wisdom and knowledge. He obtained his request. He purposed that he would never bow down to any graven image. He suffered the penalty, but with inflexible courage, trusting in the Almighty, he met the extreme dangers of his position, and received for reward not only the approval of his God and his conscience, but of the king and the nation, whose rulers were so lately eagerly and fiercely seeking his life.

According to Lieutenant F. V. Greene, Skobeloff, of whose victories we are reading in the daily journals, is a man of "stupendous military genius." Among the youngest, unjustly held back from his proper command, he obtained permission to go to the great Turco-Russian war as an aide-de-camp of another general. At the close his reputation was the brightest on the page of its history. Greene ranks him beside Wellington, Grant, and Von Moltke.

He uses this expression with regard to him: "His one thought was how to use his life so as to make an impression on his men and gain such a control over them that they would follow him anywhere." In this he had abundant success. For he fulfilled Napoleon's four ideal requirements: "1, greatness of character, or moral courage, which produces resolution (purpose); 2, coolness, or physical courage, which masters danger; 3, knowledge of his profession; and, 4, a capacity to see things as they are." A maxim that he carried out in his own conduct and enforced in those under his command was, "Never hesitate in what you have to do." The author further states concerning Skobeloff: "Though he has lived but thirty-five years, he has commanded twenty thousand men in battle; he has received the surrender of an entire army of nearly forty thousand men; he has led more assaults than any living man but Grant, and in no one of them has he failed to carry the line he assaulted, though in one case he was subsequently overwhelmed with numbers and driven out."

These examples show what I mean by fixedness of purpose.

You will trace the same marks of genius in George Washington,—in his steady application at school, in his surprising industry when left to his own guidance, working successfully at the driest problems of mathematics, surveying, geometry, logarithms, forms of business, copying and recopying with exactness; in the games and sports of his childhood and youth, preferring even in them to tax his manhood to the utmost until he excelled; in the arduous work of surveys in the valley of Virginia, requiring accuracy, knowledge, and great physical endurance, performed while yet but a boy; in his perilous expeditions among wild Indians and white enemies to the then far West; in his maiden battle, when he moderated the effect of Braddock's terrible defeat; and then ever after, through the most marvelous career of disappointments, defeats, and inconsiderable victories, which, like the discipline of the children of Israel in the wilderness, prepared the way for all the glories of the future for this great, prosperous, and happy nation of freemen.

We see these results, and we may well recognize the fact that our leader always had a *plan* in his mind and a *purpose* in his heart.

The famous Dr. Bushnell gave a discourse on the subject, entitled "The plan of God in every man's life."

A young man starts out in the dimmest dawn. He sees, at first, but a few yards before his face. He will often make mistakes in his projected journey. But God himself, in providence and action, will surely mould and shape the plan, if the young man does his best. I am not sure that the divinity is not always present in the breast of a sincere youth to give the requisite light just so soon as it is needed.

However this may be, it is absolutely necessary to a young man, who would make anything of himself, to have a plan and purpose of his own.

There are other elements of character which gave strength and consistency to the thoughts, words, and acts of George Washington, which, for the benefit of the example, I had purposed to discuss, but I find that such discussion will cause my remarks to be too much extended for this occasion, so I content myself with simply naming them.

1. Truth,—consisting in simple, straightforward, candid statements, that become more and more weighty as knowledge of the man widened and respect for him increased.

2. Reverence toward God. Profane words did not pollute his lips.

3. Faith in an ever-present and helpful Divine Master,—one that satisfied his pressing wants, especially in hours of darkness by the appointed method of prayer.

4. Love, sincere and devoted, from the home circle to the nation in whose creation he bore so prominent a part; from the Saviour, whose self-denying image he bore to all the children of men for whom that Saviour suffered and died.

One has to study closely and search long to find evidence of the weaknesses and faults that George Washington doubtless had and manifested, as do other true, brave, generous, high-minded, noble, God-fearing men; but the fact that such weaknesses and faults have gone into oblivion, disappearing with the party spirit that at one time did make handle of them, shows us the superior advantage of living such a life.

When Washington stood upon the pinnacle of his highest ambition and, whitened with age, looked forth upon a free and happy people, of whom he was very soon to take the final leave, he spoke concluding words that we may always repeat with profit:

"The situation in which I now stand for the last time, in the midst of the representatives of the people of the United States, naturally recalls the period when the administration of the present form of government commenced, and I cannot omit the occasion to congratulate you and my country on the success of the experiment, nor to repeat my fervent supplications to the Supreme Ruler of the universe and Sovereign Arbiter of nations, that his providential care may be still extended to the United States; that the virtue and happiness of the people may be preserved, and that the government which they have instituted for the protection of their liberties may be perpetual."

Doubtless my main object in presenting these thoughts has been very plain throughout. My desire is to do something to lift up our minds and hearts, be it ever so little. For this purpose, on this anniversary of his birth, nothing appears to be a better text for such a discourse than the reference to the elements of Washington's remarkable character.

Having just returned to my Alma Mater after an absence of nearly a quarter of a century, and being required to perform a part as yet new to me, I am especially desirous to understand those with whom I have

to do, and to be understood by them. This mutual knowledge will obtain in time, and by the regular, well-digested, and time-honored methods. There is no harm, however, and there may be great good, in a few words of explanation.

The other day, speaking of *intoxication* in the army, a member of Congress on the floor of the House of Representatives said, "I do not say that we should mitigate the offense of using intoxicating liquors, but I do say that if every officer of the army of the United States should be dismissed by court-martial for an offense of this character, we would not have enough commissions in the army perhaps to take charge of a platoon."

Again, the same member says, "We select men for this business of throat-cutting and brain-bespattering, this general business of death-dealing, because of their courage, because of their ability to command, because they are fitted for that particular service."

Again, another intimates that if we discharge a man because of a solitary instance of intoxication, "the effect might be that we should have no army at all." The case in hand was one of drunkenness on duty.

Let me say, young gentlemen, that the foregoing is not the character of our army officers. For a test, at the post where I have been serving, of twenty-two officers eighteen of them did not drink intoxicating liquors at all, and I never, for the term of two years that I was at that post, saw either of the others under the influence of drink.

My accounts from other parts of the army are in this respect most favorable. Army officers are not, as a rule, men given to drink. Certainly, intoxication is a vice of the past.

Again, I protest most respectfully and most solemnly against the foregoing portraiture by a member of our Congress of the character and requirements of our profession.

The Roman centurion, the commander of one hundred men, whom our Lord complimented for the strength of his faith, is the type of a Christian, a soldier-Christian.

While we stand for our rights, for the constant protection of the rights of others who are exposed, and hold solidly to the claims of self-defense, and the claims of our country upon us to protect its vital interests by arms, even at the extreme risk of our own lives, we cannot and must not surrender our consciences, nor become mere blind butchers for any tyrannical assumption of power.

No, no! a thousand times no! to every doctrine that attempts to take from the soldier the high character to which, under our government, he is entitled.

The American officer has a model before him in Washington, a model of high and pure character,—a gentleman, a man.

Let our aspiration be to the highest and best attainment of which we are capable, as a soldier, a cadet, an officer, a man. We have a

right to truth, frankness, honesty, temperance, charity, loyalty to country, to man, and to God, or to any and all of the other virtues against which there is no law.

Any young man who, by his vices, brings disgrace upon this Academy, the United States service, or the flag of his country, is not worthy to belong to the army. He is not a true son of the first general who commanded its forces.

While we doubtless should not be over-exacting with young men, who in the carelessness and thoughtlessness of youth make many mistakes and have many shortcomings, still let the young man ever keep his eyes up; let him set to himself a high standard, even the highest and best.

A young man may fail here: many must do so; but with a proper feeling, a proper disposition to do right because it is right, he need never fail from his conduct.

I have found from a long experience, as well as from reading and observation, that a close and regular discipline is the best,—in time it makes all parties happier as it makes them better.

The army cannot, neither can any portion of it, be conducted successfully like a town-meeting; something of individuality and opinion must be surrendered and conceded to the head.

This being the case, how much better it is for every man composing the army to do his best without quarreling, without irritation, and without resistance, to perform as well as he can the part allotted to him!

There is one final subject that I approach with a feeling of delicacy, for I think it a blemish wherever it exists. It may not be as bad here as formerly. I refer to a practice of ostracism. I cannot say that one should take to his bosom a thief, a liar, or even a profane swearer, or common drunkard; but I do say that a combination of three or four young men to procure the ostracism of another, and that often for a mere opinion, an idiosyncrasy, or some unpleasant habit not yet corrected by our code of good manners, is wrong.

General McPherson, a man of great independence of character and purity of life, refused, as a cadet, to ostracise a member of his class at the call of a clique, which had already succeeded in making the youth lonely and wretched.

My thought in this address is that there is no demand that can be made upon us here that shall debar us from all the rights and privileges of a Christian manhood.

Let the heart of the youngest be clear and bright, let him emulate the virtues of the thousands of veteran graduates who feared to look no man in the face,—who shrank from no danger or difficulty, but would rather die in their tracks than do a deliberate wrong. George Washington was their forerunner and true exemplar.

Shall we not aim equally high and compass at least a measure of this true nobility?

EDITORIAL NOTES.

THE subject of education in the army—meaning thereby the intellectual culture of the enlisted men—is one that commends itself to the earnest attention of all who have the good of the country and the army at heart. Time was when the soldier, both in fact and in the contemplation of his officers, was little else than a machine, or part of a machine. His only instruction was directed to the suppression of his individuality, and the more perfectly this was accomplished the better soldier he was thought to be. This state of things argued no indifference to his well-being on the part of those set over him, but was simply the outcome of the tactics of the period. Neither the soldier himself nor his officer could escape from the reflex influence of the machine idea that pervaded the military system that then existed. To cultivate out of the ranks what in the ranks was persistently suppressed—namely, the individual traits and qualities of the soldier—was so far illogical as never to propose itself seriously to the officer's mind. Intellectually, the soldier's enlistment left him pretty much as it found him. In thus saying we speak, of course, in general terms, for we are well aware that in exceptional cases the mental culture of the soldier was not wholly neglected. Times now have changed. The art of war has become so modified that the soldier has ceased to be the wooden man of former days, and has become a reasoning and intelligent factor in the production of the results which war aims to attain. As a fighter, he is no longer merely the executive of his superior's orders; he must on many occasions be a law unto himself, and must both devise and execute his own plan of operations. In short, the tendency of modern war is to individualize the soldier,—a process the exact opposite of that which formerly obtained. Regard to his efficiency, therefore, to say nothing of sentimental or moral considerations, demands that he be roused out of the mental apathy in which of old we were content to leave him, and that his intelligence be quickened by the spur of education. The system of post schools inaugurated by General Order No. 24, War Department, A. G. O., series of 1878, is yet in its infancy, but enough has been accomplished to show both its usefulness and its practicability. The benefit of these schools extends not only to the enlisted men of the army, but also to the very considerable

number of women and children who are included in what may be called our army population. The sixty-three schools now in operation have in attendance two thousand three hundred pupils, and a marked improvement in the morals, as well as the intelligence, of the men under instruction is observable. Chaplain George G. Mullins, who has been immediately in charge of the work of establishing these schools, has also given much attention to the establishment of comfortable reading-rooms, fully supplied with papers and magazines, for the use of enlisted men, and we learn that one hundred and ten such rooms are in operation. The Quartermaster's Department, the chief of which has manifested a lively interest in the work, has in the past year furnished ten thousand dollars' worth of reading matter to army posts, and in the last two years has erected thirty-two chapel-, library-, and school-buildings. Space will not permit us to go further into the details of the excellent work already accomplished by Chaplain Mullins, under the direction of General A. McD. McCook, who has been the efficient head of the post-school system. Our purpose is to stimulate interest in the work, which ought to enlist the hearty sympathy and co-operation of every officer of the army. It is hoped that the next Congress will provide for the enlistment of the one hundred and fifty teachers recommended by the late Secretary of War, and, by so doing, remove what is now the most serious obstacle to the full success of the system,—the want of competent instructors. Such a body, organized under the supervisorship of an efficient chief, helped by the cordial sympathy of post commanders, would soon place our system of army education on an enduring basis, and achieve results that would amply repay all that it would cost.

ENGLISH "jingoism" has received a stunning shock from what it esteems the pusillanimity of the government in consenting to an armistice and peace negotiations with the Boers while the defeat and death of General Colley remain unavenged. Such a departure from the traditional practice of British Cabinets brings anguish to the "jingo" soul. The blatant patriotism which is epitomized in this slang term sees in the new course adopted by the government the beginning of the decline and fall of England's greatness. If it would cease its howlings long enough to catch the echoes of the indignation that the war upon the Boers has called forth from nearly every part of the civilized world, it might be, if not comforted, at least reconciled to the propriety of getting out of the South African war on the best terms possible. General Colley, it is said, fell in the act of giving the command to "cease firing," and the British government will best serve his memory, and its own reputation, by turning a deaf ear to the clamors of "jingoism" and giving permanent effect to the last utterance of the dead chieftain.

To military men, no feature of the inauguration ceremonies was more impressive than the display made by the column of Pennsylvania militia which formed part of the procession on that occasion. Clad in the army fatigue dress, thoroughly and uniformly equipped, and giving evidence of careful instruction and drilling, these militiamen might, as the Adjutant-General of the army is said to have remarked, "been marched out of the procession and taken directly into a campaign." In a merely spectacular way, they would have lent more of color and brilliancy to the pageant had they appeared in the old-time fancy costumes to which the militia of most of the States still adhere, but that result would have been attained at the sacrifice of the far more impressive effect produced by their uniformity of dress and equipment and their steadiness and discipline in the ranks. Pennsylvania has well learned the lessons taught by the labor disturbances of 1877, and, by the reorganization of her militia system on a thoroughly practical basis, has effectually provided against a recurrence of the memorable disasters of that year.

WE have received the speech of Hon. Benjamin W. Harris, of Massachusetts, on the joint resolution (H. R., No. 308) relating to color-blindness and visual acuteness in persons employed in the navy and merchant marine, delivered in the House of Representatives, February 18, 1881. It presents very clearly the necessity for an international congress to determine standard tests of visional power and color perception for railroad employees and the navy and merchant marine, and, with its appendix, forms a succinct summary of the opinions of scientists, and the action of the National and State governments in relation to the subject.

A GREATER shock than the army has received by the death of General Upton could scarcely be conceived of. In the very prime of life, his past full of honorable achievement and his future of promise, it is very hard to imagine what could have prompted the dreadful act which has so suddenly closed a career that seemed so bright. Fuller information than we have yet received may shed some light on the cause of this melancholy event; but now we can only wonder and deplore. It seems but yesterday that he was by our side, looking over the proofs of his articles on Compulsory Retirement, and encouraging us to hope for future contributions from his pen. In his death THE UNITED SERVICE has lost a friend, and the army one of its brightest ornaments.

SERVICE LITERATURE.

On the 25th of January General George W. Cullum, U.S.A., read before the American Geographical Society, of which he is vice-president, a paper on "The Land of Egypt," which is printed in the bulletin of the Society. It is a most interesting narrative of General Cullum's experience in that country in 1851, and, within the compass of thirty pages, includes a wonderfully comprehensive survey of the captivating region that forms its subject.

Among all our exchanges none is more welcome than the "old reliable" *Army and Navy Gazette* of London. It is a most ably conducted weekly journal, and to any one wishing to keep thoroughly posted on British military and naval affairs is indispensable.

Southern Historical Society Papers is the title of a monthly publication in which are collected and preserved the records and reminiscences of prominent actors on the Southern side in our great Civil War. It is published at Richmond, Va., under the editorial charge of Rev. J. William Jones, D.D. While of course presenting everything from a Southern stand-point, it is, for that very reason, valuable to every one who wishes to obtain a comprehensive view of the history of the momentous struggle, and the society is doing a substantial service to the future historian by bringing within reach such a mass of authentic material. The society has completed eight volumes of its papers, and with the current year entered upon the ninth.

A very interesting book is "The Story of a Soldier's Life," by Lieutenant-General John Alexander Ewart, C.B. (Sampson Low, Marston, Searle & Rivington). The story is divided into three parts, treating of "Peace," "War," and "Mutiny," giving, severally, the author's experiences of garrison life, the Crimean war, and the Indian mutiny.

L. R. Hamersly & Co. announce for issue in May "The Military Dictionary" of Major Thomas Wilhelm. The work will make a volume of about six hundred imperial pages, will be fully illustrated, and sold bound in cloth at five, and in sheep at six dollars. At the suggestion of prominent officers of the army the biographical feature has been entirely omitted, leaving it purely a Military Dictionary, the definitions, however, being full enough to give even a novice a clear idea of all matters relating to the profession of arms. Of this volume General Sherman wrote to Major Wilhelm as follows:

"I was very much pleased to receive your letter of December 13th, and the volume of your preparation, which is most valuable to the profession and does honor and credit to you for the industry, skill, and intelligence displayed.

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"It seems to me that you can well venture to have it stereotyped, printed, and offered for sale; for it cannot fail to come into demand for general use, not only by the army, but by the militia and citizens generally. I have tested the accuracy of the contents by many references, and have had several skillful officers of my staff to subject it to a still more critical test, and all agree that as a book of reference, as its title indicates, it is *most* valuable and should be at the elbow of every army officer."